Service manual

English

F5 Corpus

Introduction

The Service Manual is intended for technical personnel who maintain and repair power wheelchairs. It is important that anyone who performs maintenance and repairs described in this manual reads and understands the content of this manual so that the work is performed professionally. Always state the chassis number when contacting Permobil to ensure that the correct information is provided.

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SERIAL NUMBER LABELS

Chassis

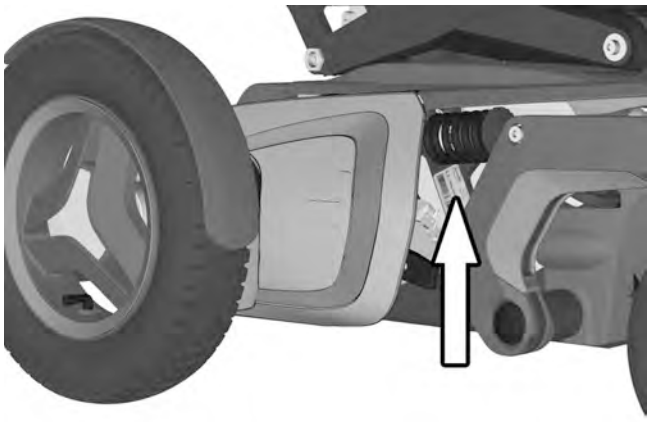

Figure 1. Chassis identification number.

R-net Power Module

Figure 2. Rnet Power Module ID number.

R-net control panel

Figure 3. Control panel Rnet ID number.

REPAIRS

Covers

Removal of the chassis covers

1. If possible, on chassis with electric seat lift, raise the seat halfway up, or on chassis with seat tilt only or fixed seat tube, raise the seat tilt halfway backwards, to facilitate removal of the chassis top cover.

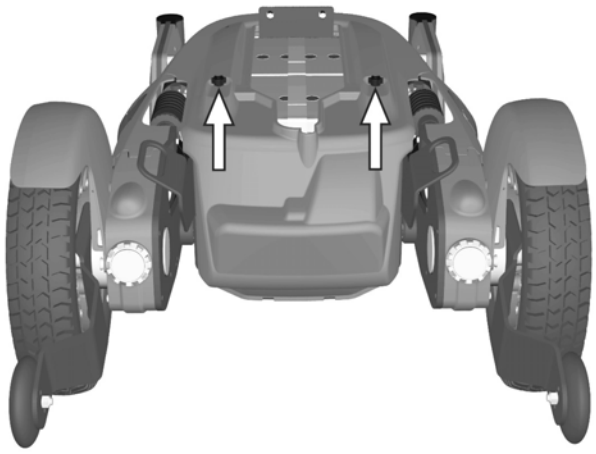

Figure 4. The chassis covers are fitted with two knobs.

2. Switch off the main power switch on the control panel.
3. Remove the two knobs holding the chassis covers. See fig. 4.
4. Pull the top chassis cover backwards off the chassis. See fig. 5.

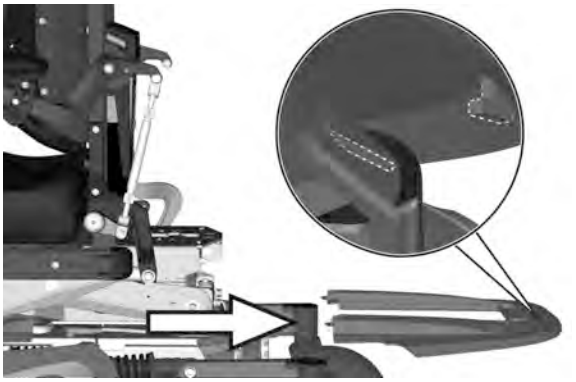

Figure 5. The chassis top cover.

5. Pull the rear chassis cover off the chassis. See fig. 6. Note that the cover is mounted around the axles of the link arms. On Chassis with lights, disconnect the connector at the back marked “Rear lights and indicators” from the rear lights cabling.

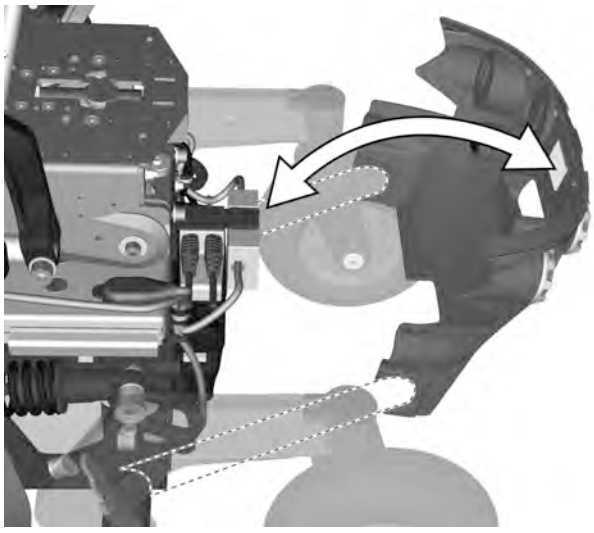

Figure 6. The chassis rear cover.

6. Pull the front chassis cover off the chassis. See fig. 7. Note that the cover is assembled partially inside the chassis at the lower edge.

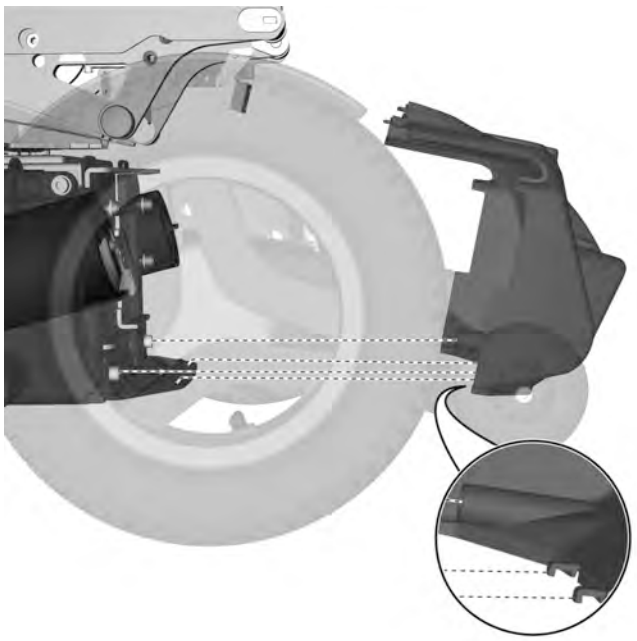

Figure 7. The chassis front cover.

Assembly of the chassis covers

1. If possible, on chassis with electric seat lift, raise the seat halfway up, or on chassis with seat tilt only or fixed seat tube, raise the seat tilt halfway backwards, to facilitate removal of the chassis top cover.
2. On Chassis with lights, connect the connector at the back marked “Rear lights and indicators” to the rear lights cabling.

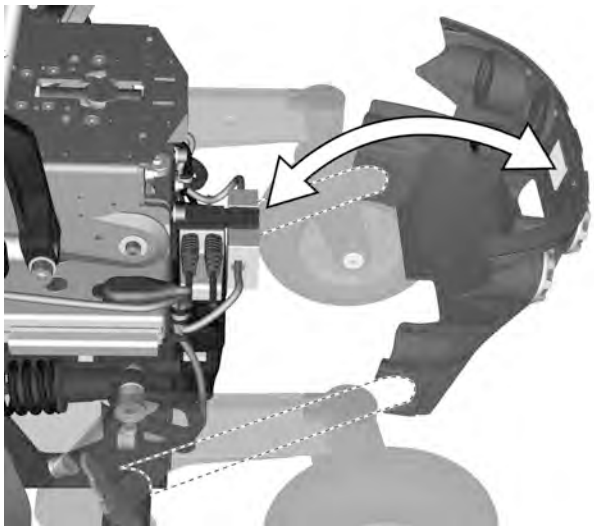

Figure 8. The chassis rear cover.

Assemble the rear chassis cover on to the chassis by positioning the covers on the axles of the link arms. See fig. 5.

3. Fasten it on the hook and loop fastener by pressing on rear edge of the chassis cover (with a click). See fig. 8.
4. Slide the top chassis cover on to the chassis and at the same time push the rear edge of it downwards to make sure it hooks on to the rear chassis cover. See fig. 9.

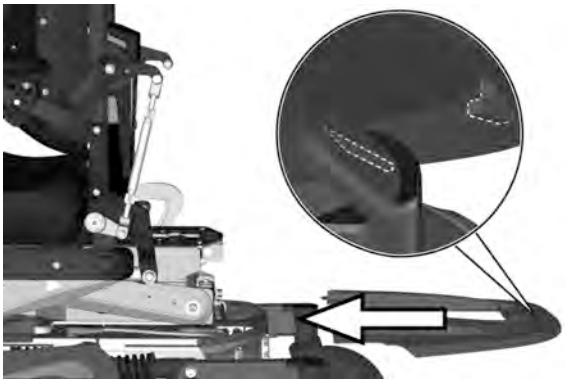

Figure 9. The chassis top cover.

5. Assemble the front chassis cover on to the chassis. See fig. 7. Note that the cover is assembled partially inside the chassis at the lower edge. Position the cover making sure the fixing points are correctly positioned with the screw heads in corresponding holes of the cover.

Figure 10. The chassis front cover is assembled partially inside the chassis at the lower edge.

6. Assemble the two knobs holding the chassis covers without tightening them. See fig. 11.

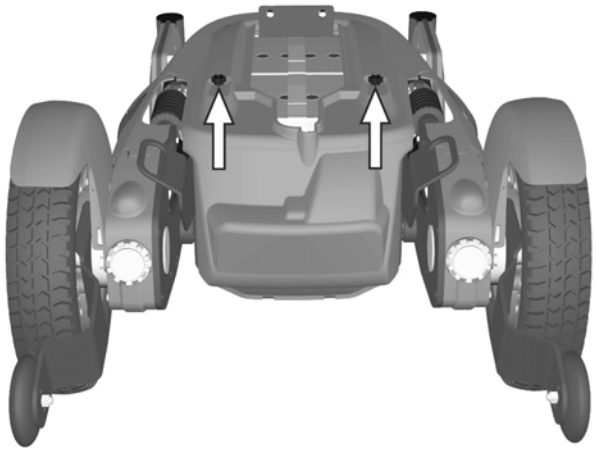

Figure 11. The chassis covers are fitted with two knobs.

7. Press the top chassis cover and the front chassis cover against each other until any space between them is eliminated, then tighten the knobs.

Removal of the link arm accent colour cover

There is an accent colour cover fitted on each link arm. This cover can be removed with the link arm still assembled on the wheelchair.

1. Switch off the main power switch on the control panel.
2. Remove the accent colour cover by carefully bending it loose from underneath of the link arm by using a screwdriver. See fig. 12.

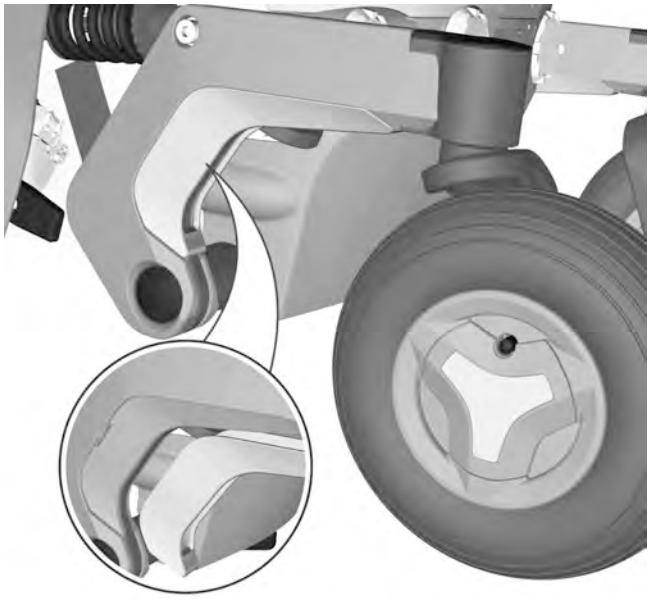

Figure 12. Link arm accent colour cover.

Assembly of the link arm accent colour cover

There is an accent colour cover fitted on each link arm. This cover can be removed with the link arm still assembled on the wheelchair.

1. Switch off the main power switch on the control panel.
2. Fit the link arm accent colour cover by carefully pushing it in to position until you hear a “click”. See fig. 12.

Removal of the link arm covers

Both sides of the link arms have covers fitted. The covers are fitted with three screws. To remove these covers, the link arm has to be removed. There is also an accent colour cover fitted on each link arm. This cover can be removed with the link arm still assembled on the wheelchair. See *Removal of the link arm accent colour cover*, Page 16.

1. Switch off the main power switch on the control panel.
2. Remove the accent colour cover. See *Removal of the link arm accent colour cover*, Page 16.
3. Remove the link arm. See *Link arms*, Page 37
4. Remove the three screws holding the link arm covers, see fig. 13.

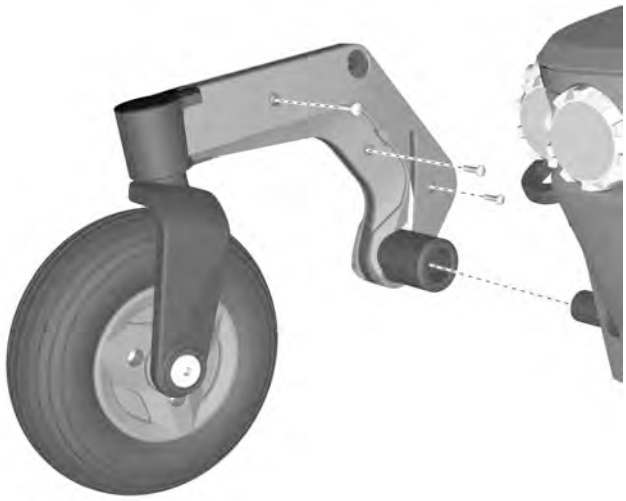

Figure 13. The link arm covers are mounted with three screws.

Assembly of the link arm covers

Assemble in the reverse order.

1. Fit the link arm covers using the three screws, see fig. 13.
2. Fit the link arm. See *Link arms*, Page 37
3. Fit the link arm accent colour cover. See *Assembly of the link arm accent colour cover*, Page 16.

Removal of the drive package covers including the front fender

Removal of front fender

NOTE!
In fig. 15 the wheelchair is shown without the drive wheel to get a better view of the front fender. However, the drive wheel do NOT need to be removed for this operation.

1. On wheelchairs with lights, pull the cable out of the slot to reveal the cable connector. Divide the connector to unplug the front lights. See fig. 14.
2. Rotate the drive wheel in question to get access to the screw (1) holding the front fender. See fig.15.

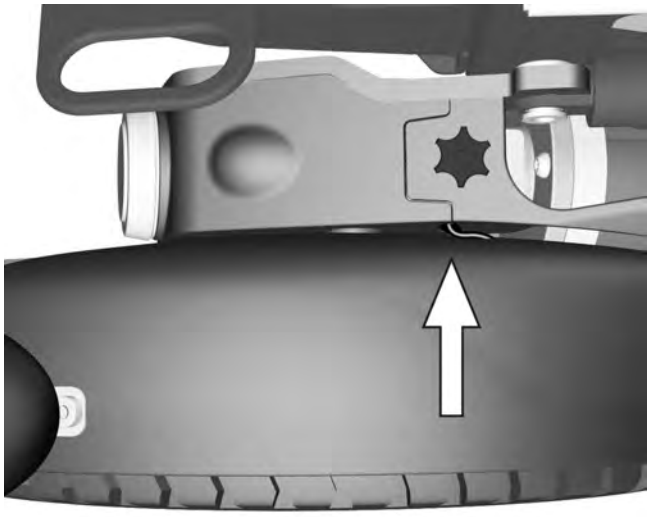

Figure 14. On wheelchairs with lights, pull the cable out of the slot to reveal the cable connector. Divide the connector to unplug the front lights.

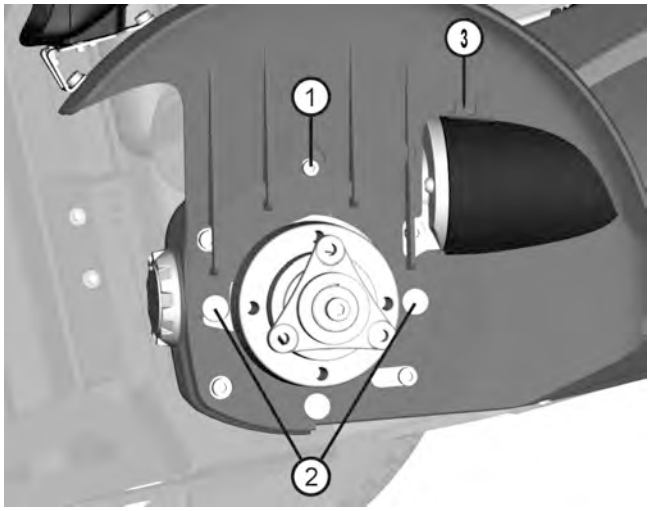

Figure 15. The front fender is fitted with one screw (1) and two fixing points (2) at the bottom.

3. Remove the screw and washer. Carefully pull the front fender straight up.

Removal of drive motor cover

The drive motor cover is assembled with a knob (3) on the top and hook and loop fasteners (4) on the side and a fixing point (5) at the bottom. See fig. 16.

NOTE!
The front fender needs to be removed before removing the drive motor cover. See *Removal of front fender*, Page 18.

1. Remove the knob (3). See fig. 16.
2. Pull the upper rear edge of the drive motor cover straight out to release the hook and loop fastener (4). Bend a bit at the lower edge to release the cover from the fixing point (6) and then pull it strait backwards to release it from the fixing points (5).

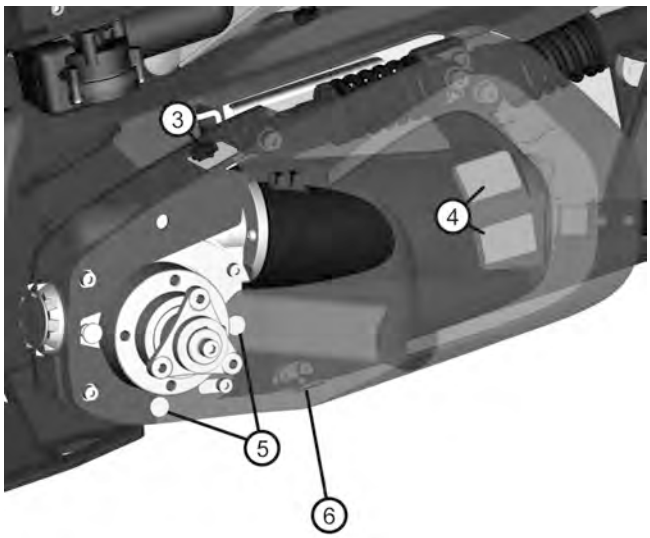

Figure 16. The drive motor cover is assembled with a knob (3) on the top and a dual lock (4) on the side and a fixing point (5) at the bottom.

Removal of drive gear cover

The drive gear cover is assembled with a hook and loop fastener at the top.

1. **NOTE!**
   The front fender needs to be removed before removing the drive gear cover. See *Removal of front fender*, Page 18.

   On wheelchair with VS-seat, raise the seat to standing position making the support wheels go down towards the floor.
2. Carefully pull the upper edge of the drive gear cover upwards until the hook and loop fastener (7) releases. Then move the cover forward to release it from the fixing point (8) and simultaneously a bit outwards to make the screw heads (9) go out of the recesses of the drive gear cover.

   On wheelchairs with indicators, disconnect the indicator by dividing the connector on the cable.

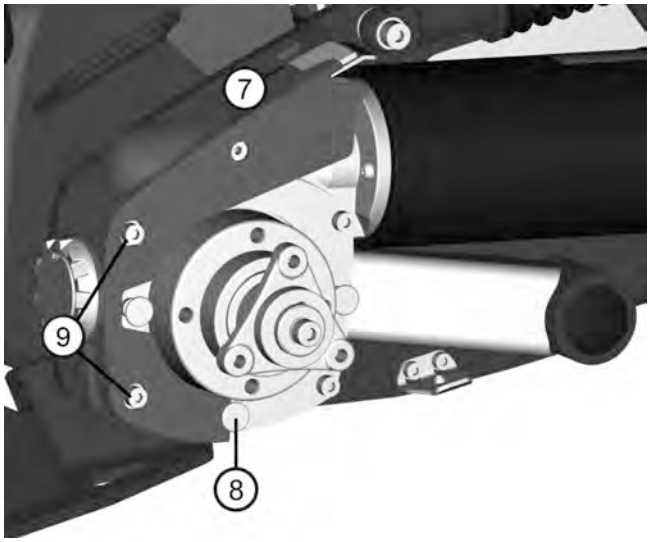

Figure 17. The drive gear cover is assembled with one hook and loop fastener at the top (6) and a fixing point at the bottom (7).

Assembly of the drive package covers including front fender

Assembly of drive gear cover

The drive gear cover is assembled with one hook and loop fastener at the top (7) and a fixing point at the bottom (8). See fig. 18.

1. On wheelchair with VS-seat, raise the seat to standing position making the support wheels go down towards the floor.

   Position the cover on the drive gear making sure the fixing point (8) is correct positioned in the groove of the cover and that the screw heads (9) are positioned in the recesses of the cover. See fig. 18.
2. Position the cover and press it from above against the gear until the hook and loop fastener attaches with a "Click".
3. On wheelchairs with lights and indicators, connect the indicators cable to the connector marked front lights and turn signal. Position the other cable around the gear and through the slot on top of the cover. See fig. 19.

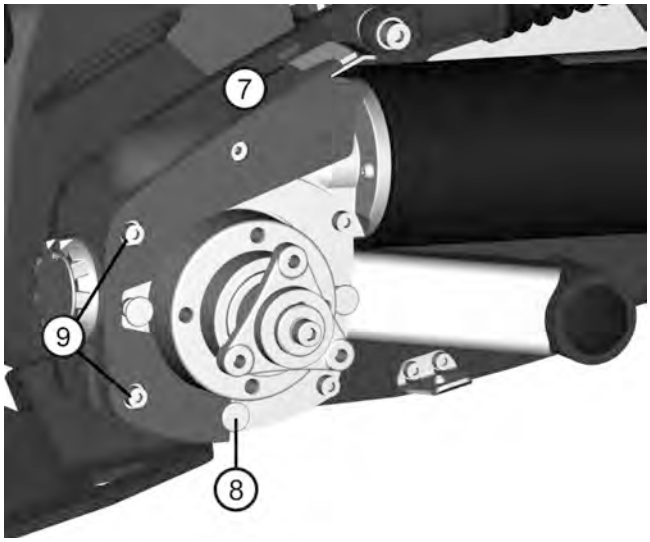

Figure 18. The drive gear cover is assembled with one hook and loop fastener at the top (7) and a fixing point at the bottom (8).

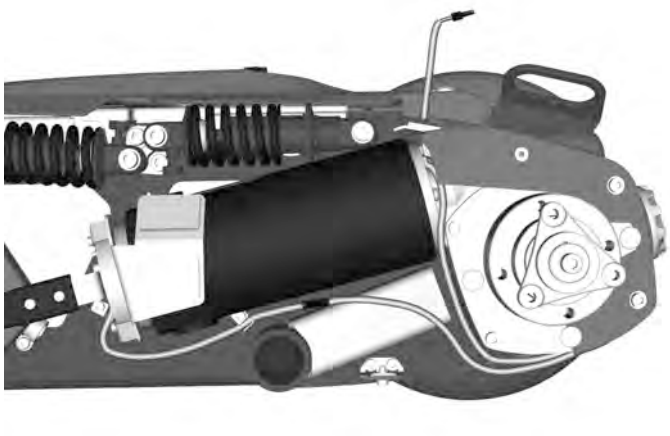

Figure 19. On wheelchairs with lights and indicators, connect the indicators cable to the connector marked front lights and turn signal. Position the other cable around the gear and through the slot on top of the cover.

4. On wheelchairs with lights only (no indicators), position the adapter cable between the drive motor and gear and through the slot on top of the cover. See fig. 20.

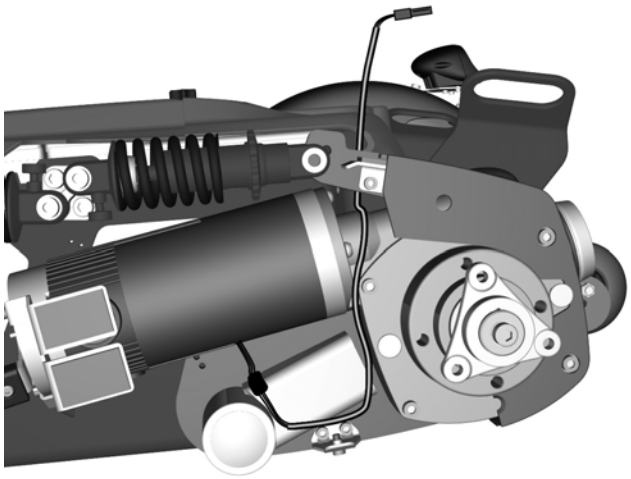

Figure 20. On wheelchairs with lights only (no indicators), position the adapter cable between the drive motor and gear and through the slot on top of the cover.

Assembly of drive motor cover

The drive motor cover is assembled with a knob (3) on the top and hook and loop fasteners (4) on the side and a fixing point (5) at the bottom. See fig. 16.

1. Position the drive motor cover on the fixing point at the lower edge of the drive gear.
2. Position the cover on the drive package making sure the fixing point (5) is correct positioned with the screw head (6) in corresponding hole of the cover. See fig. 21.
   NOTE!
   You might need to carefully bend the cover a bit to get it in correct position.
3. Make sure it fits towards the drive gear cover and assemble the knob (3) on the top. See fig. 21.
4. Press the cover from the side against the drive package until the hook and loop fastener (4) attaches with a "Click". See fig. 21.

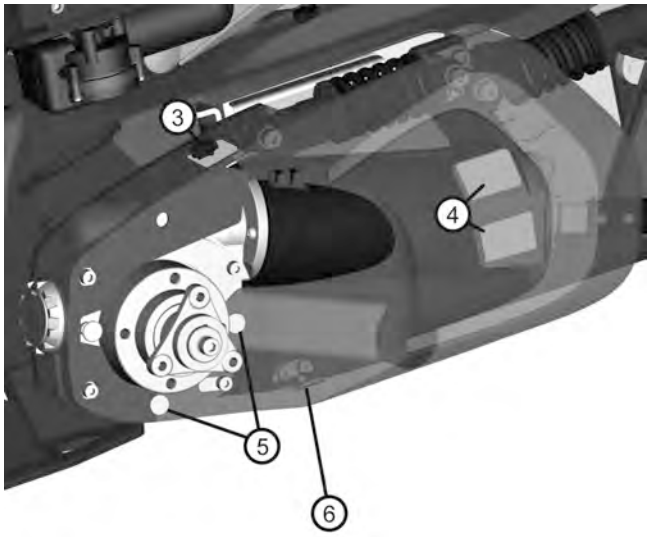

Figure 21. The drive motor cover is assembled with hook and loop fasteners (3 – 4) and a fixing point (5) at the bottom.

Assembly of front fender

The front fender is assembled with a screw (1) and two fixing points (2). See fig. 23.

NOTE!
In fig. 23 the wheelchair is shown without the drive wheel to get a better view of the front fender. The drive wheel do NOT need to be removed for this operation.

NOTE!
On wheelchairs with lights, make sure to position the end of the lights cable up the hole through the fender. See fig. 22.

1. Position the front fender making sure the two fixing points (2) are correctly positioned in the grooves on the fender. See fig. 23.
2. Assemble the screw (1) and washer. See fig. 23.

   NOTE!
   The front fender and the drive motor cover should be attached in a groove (3). See fig. 23.
3. Position the drive motor cover making sure the two fixing points are correctly positioned in the grooves on the fender.
4. On wheelchairs with lights, connect the lights cable to the cable positioned in the slot on top of the driver gear cover. After connecting, push the cables and connectors into the slot, i. e. hide the connectors inside the drive gear cover. See fig. 24.

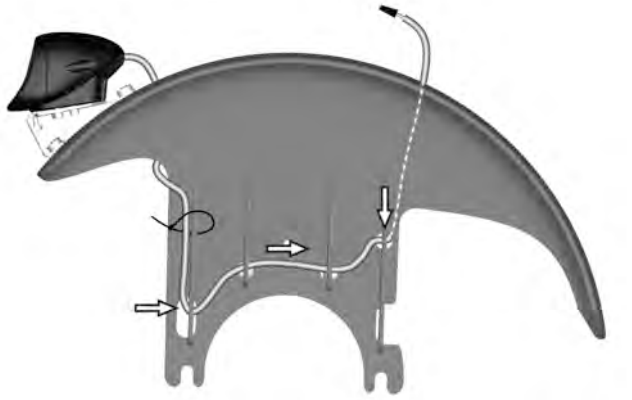

Figure 22. On wheelchairs with lights, make sure to position the end of the lights cable up the hole through the fender.

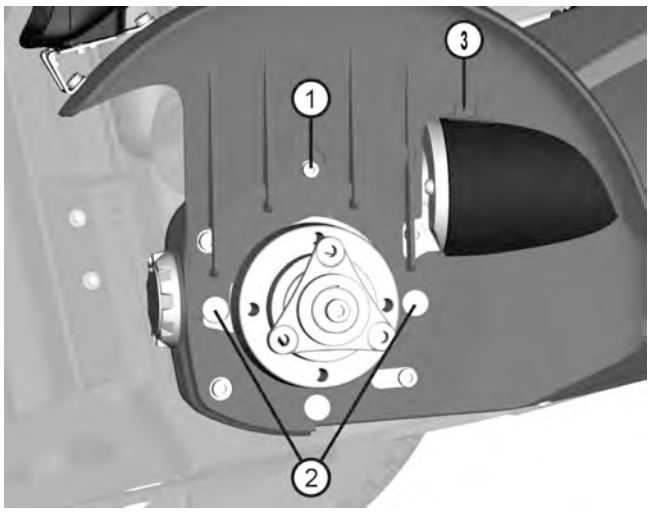

Figure 23. The front fender is fitted with one screw (1) and two fixing points (2) at the bottom.

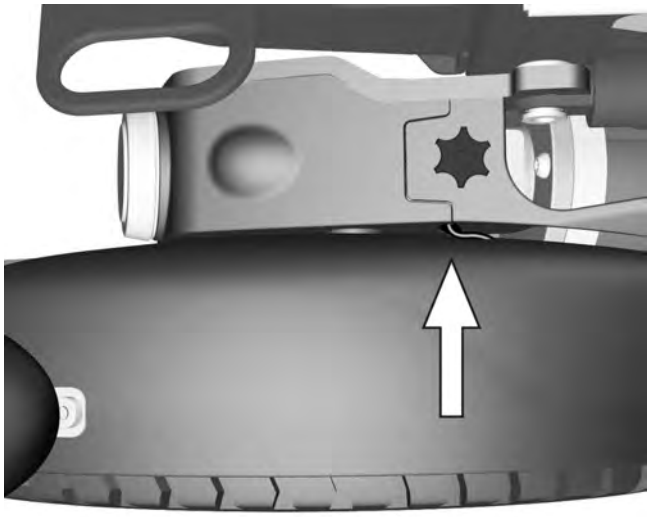

Figure 24. After connecting, push the cables and connectors into the slot, i.e. hide the connectors inside the drive gear cover.

Batteries

Removal of the batteries

For this task the following tools are necessary:

- Torque wrench
- 1 Allen key socket 8 mm.
- 1 Spanner 13 mm.

1. Place the wheelchair on a level surface. If possible, on chassis with electric seat lift, raise the seat halfway up, or on chassis with seat tilt only or fixed seat tube, raise the seat tilt halfway backwards, to facilitate removal of the chassis top cover.

2. Switch off the power supply using the ON/OFF key on the control panel and switch the automatic main fuse to Off.

Figure 25. Main fuse.

3. Remove the two knobs holding the chassis top- and rear-cover. See fig. 26.

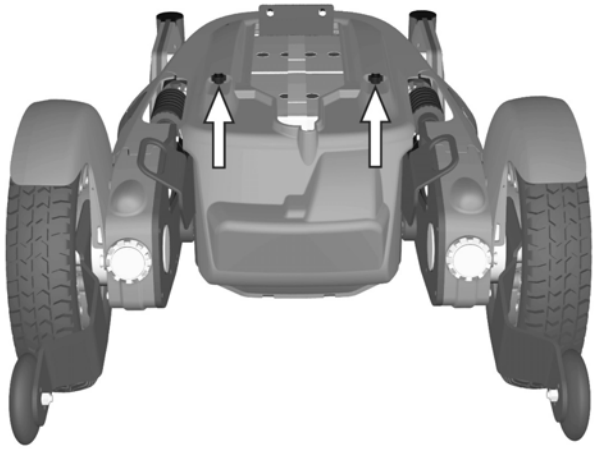

Figure 26. The chassis covers are secured with two knobs.

4. Slide the top chassis covers off the chassis. See fig. 27.

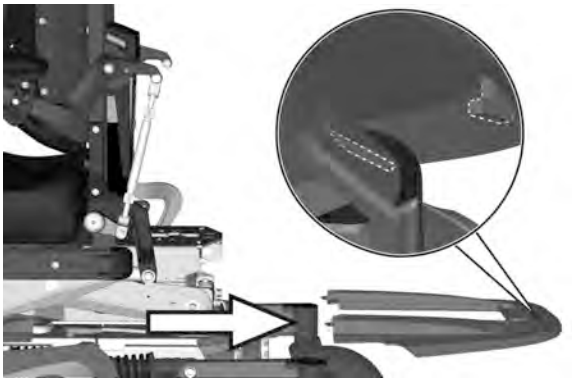

Figure 27. The chassis top cover.

5. Pull the rear chassis covers off the dual locks and off the chassis. See fig. 28.

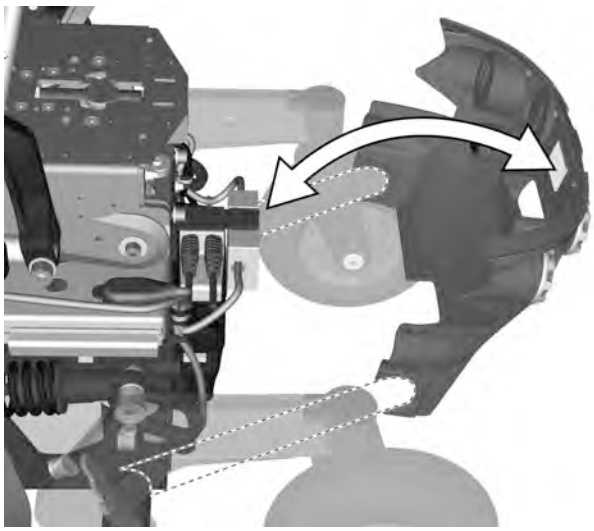

Figure 28. The chassis rear cover.

6. Remove the four screws holding the battery box. See fig. 29.

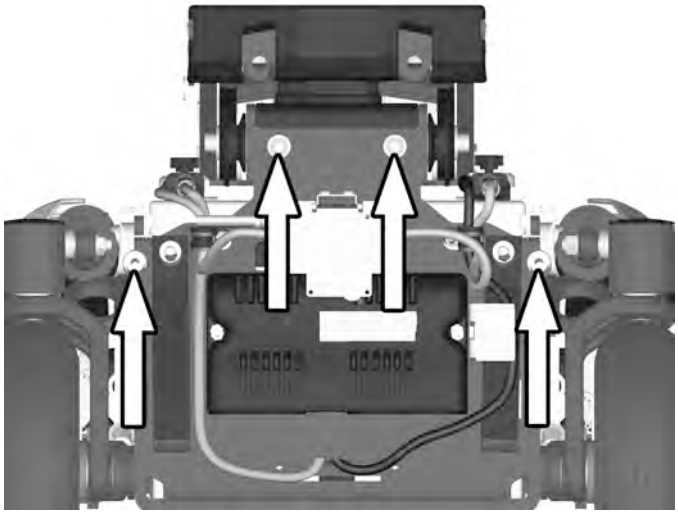

Figure 29. The battery box is secured with four screws.

7. Disconnect the drive motor connections from the Power Module. See fig. 30.

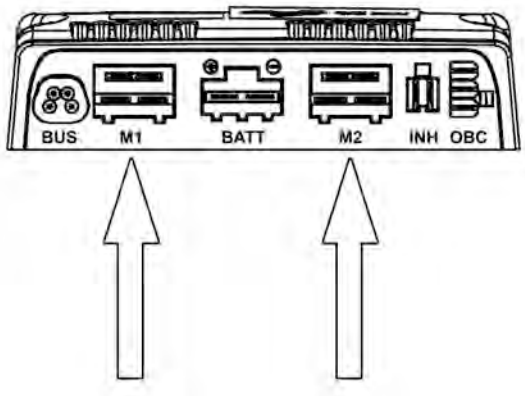

Figure 30. Drive motor connections.

8. Use the straps to pull the battery box out of the chassis. See fig. 31.

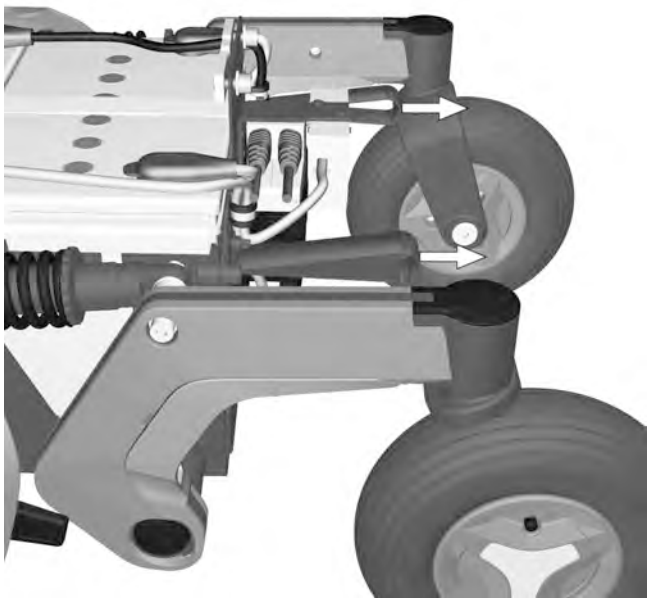

Figure 31. Use the straps to pull the batteries and the electronics out of the chassis.

9. Loosen the battery connections. See fig. 32.

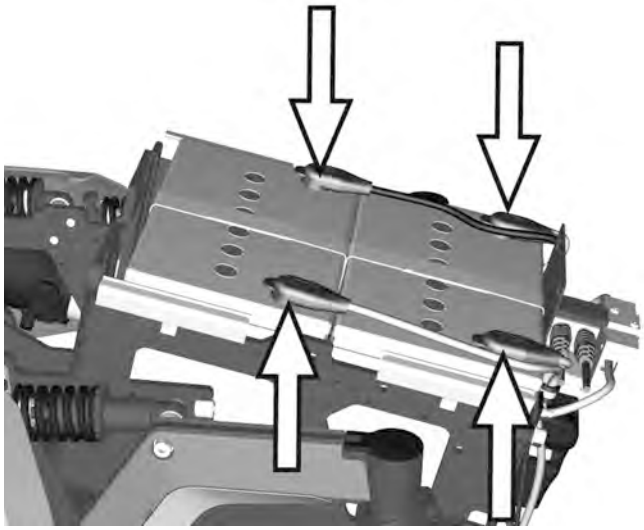

Figure 32. The batteries and their connectors.

⚠ WARNING!

Be careful when using metal objects when working with batteries. A short-circuit can easily cause an explosion. Always use safety gloves and safety goggles.
Remember that the batteries are heavy and must be handled with great caution.

10. Lift the batteries out of the battery box using the battery straps.

Fitting of the batteries

1. Use battery straps and lift new batteries in reverse order (leave the straps on the new batteries). Connect the battery connections.

   NOTE!
   Also see the sticker on the inside of the chassis covers
2. Wrap the cable connected to the left battery pole of the rear battery one turn around the cable holder. See fig. 34.

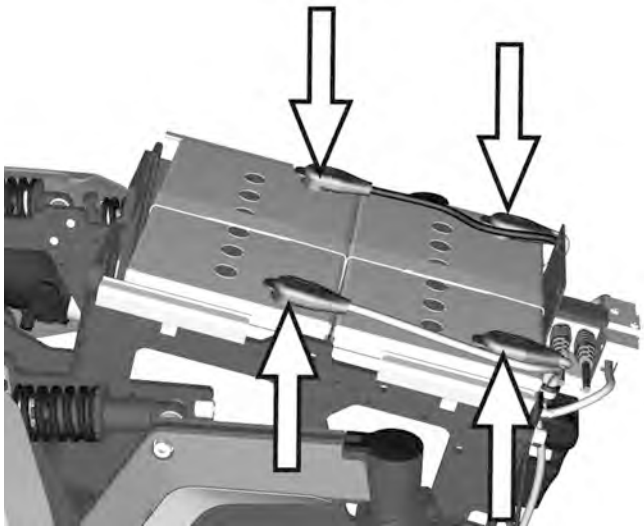

Figure 33. The batteries and their connectors.

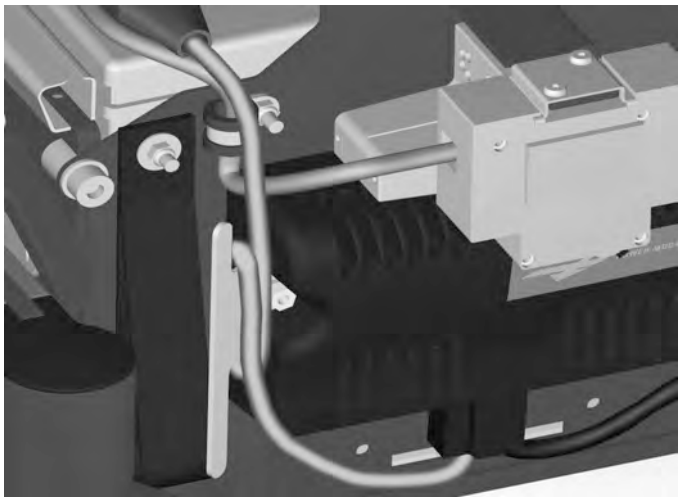

Figure 34. Wrap the cable connected to the left battery pole of the rear battery one turn around the cable holder.

3. Push the battery box in to the chassis.
4. Reconnect the drive motor connections to the Power Module. See fig. 35.

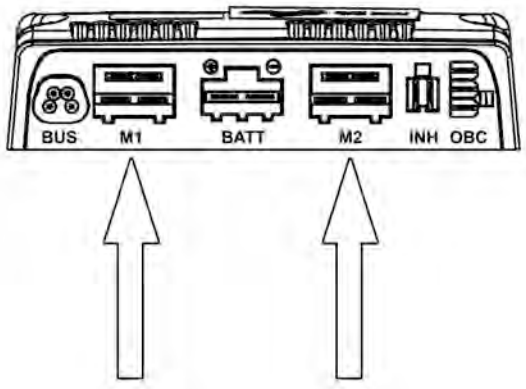

Figure 35. Drive motor connections.

5. Refit the four screws securing the battery box. Use a torque wrench to tighten the screws. **Tightening torque: 24 Nm / 17.7 Ft/lbs.** See fig. 36.

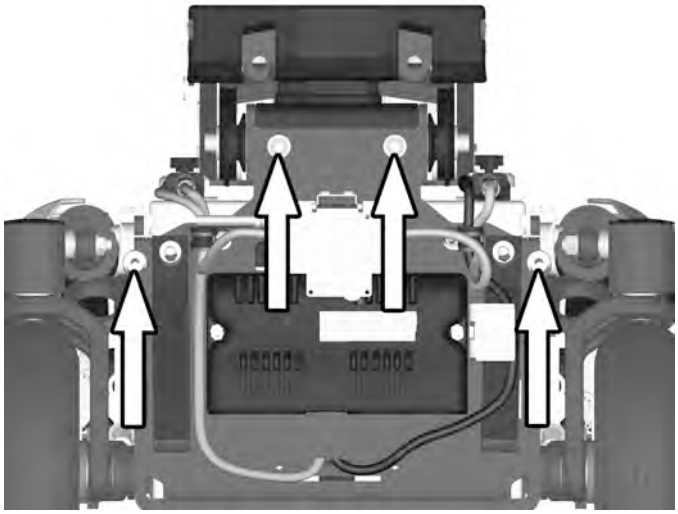

Figure 36. The battery box is secured with four screws.

6. Refit the rear chassis cover on to the chassis. See fig. 37.

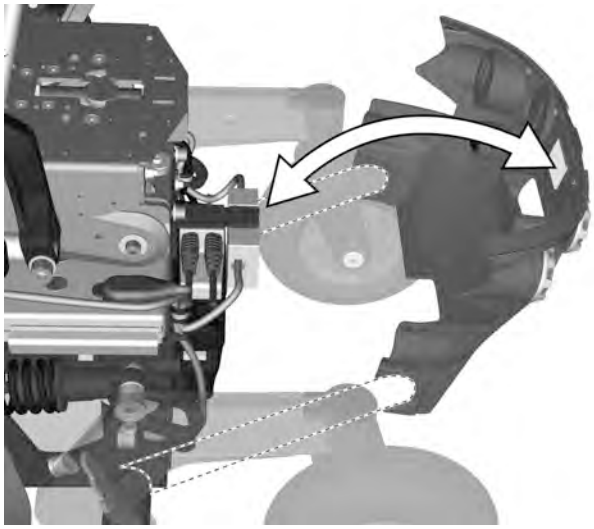

Figure 37. The chassis rear cover.

7. Refit the top chassis covers on to the chassis. See fig. 38.

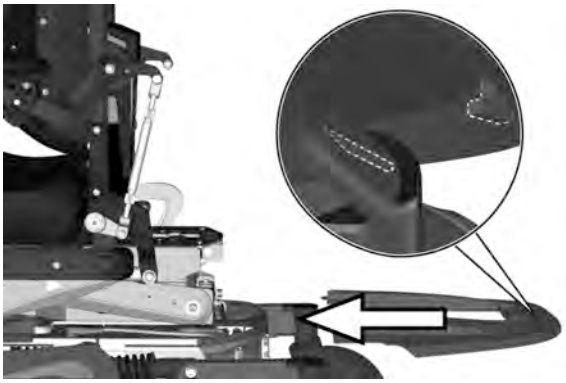

Figure 38. The chassis top cover.

8. Assemble the two knobs holding the chassis covers without tightening them. See fig. 39.

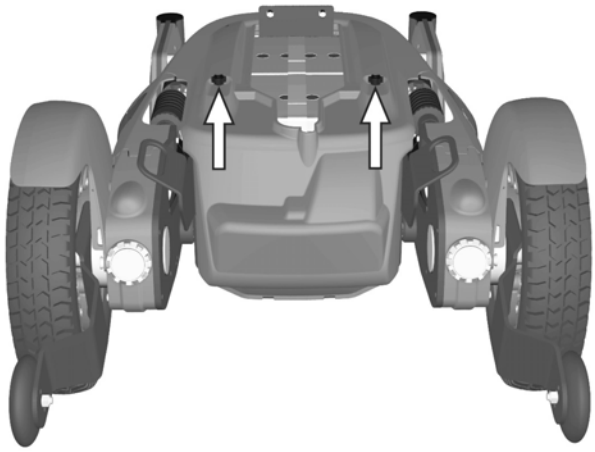

Figure 39. The chassis covers are fitted with two knobs.

9. Press the top chassis cover and the front chassis cover against each other until any space between them is eliminated, then tighten the knobs.

10. Switch the automatic main fuse to position “On”.

Figure 40. Main fuse.

⚠ CAUTION!

Used or malfunctioning batteries should be disposed of responsibly in accordance with local recycling regulations.

Wheels

Drive wheels

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key socket 6 mm.

Removal

1. Switch off the main power switch on the control panel.
2. Lift up and chock up the wheelchair chassis so that the wheel in question is free of the ground.
3. Remove the hub cap by carefully levering it out using a finger on each edge of the hub cap.
4. Remove the three screws that hold the wheel in place.
5. Remove the spacer (only on some models).

⚠ WARNING!

The central screw must not be removed.

6. Remove the wheel by pulling it straight out.

Assembly

Assemble in the reverse order. In some configurations, the wheels might be fitted with a spacer (4). Tighten the three screws using a torque wrench.

Tightening torque 24 Nm / 17.7 Ft/lbs.

Items

1. Hub cap
2. Screw, ISO 4762 M8x20 8.8 Fe/Zn 5 C1
3. Drive wheel
4. Spacer (on some models)
5. Washer

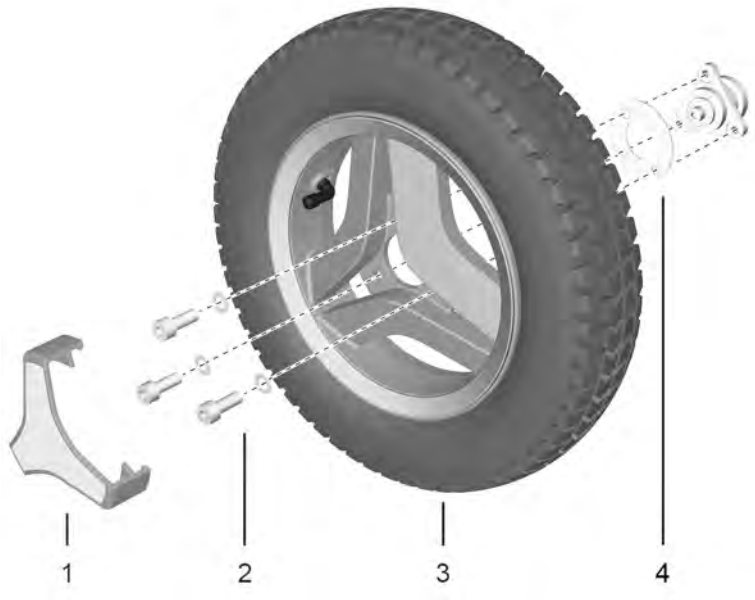

Figure 41. Assembly/removal of drive wheels.

Taking the rim apart

The rim can be taken apart to make it possible to assemble/remove solid or pneumatic tires.

1. Remove the wheel in question from the wheelchair. See *Removal*, Page 29.
2. If the tire is pneumatic, release the air.

⚠ WARNING!

Ensure that pneumatic tires are not pressurized before the rim is taken apart, otherwise there is a risk of personal injury.

3. Remove the six screws holding the two halves of the rim together. See fig. 42.
4. Take the rim apart.

Assembly

Assemble in the reverse order. Tighten the six screws using a dynamometric wrench.

Tightening torque: 22 Nm / 16.2 Ft/lbs.

⚠ WARNING!

The recommended tire pressure for pneumatic tires is 200–250 kPa / 2–2.5 bar / 29–36 psi. Overfilling entails a risk of explosion.
Incorrect tire pressure may result in lower stability and manoeuvrability. Check regularly that the tires have the correct pressure.

Items

1. Rim, outer section
2. Inner tube
3. Tire
4. Rim, outer section
5. Screw, ISO 4762 M6x25 8.8 Fe/Zn 5 C1 / Locking coat DIN 267-28

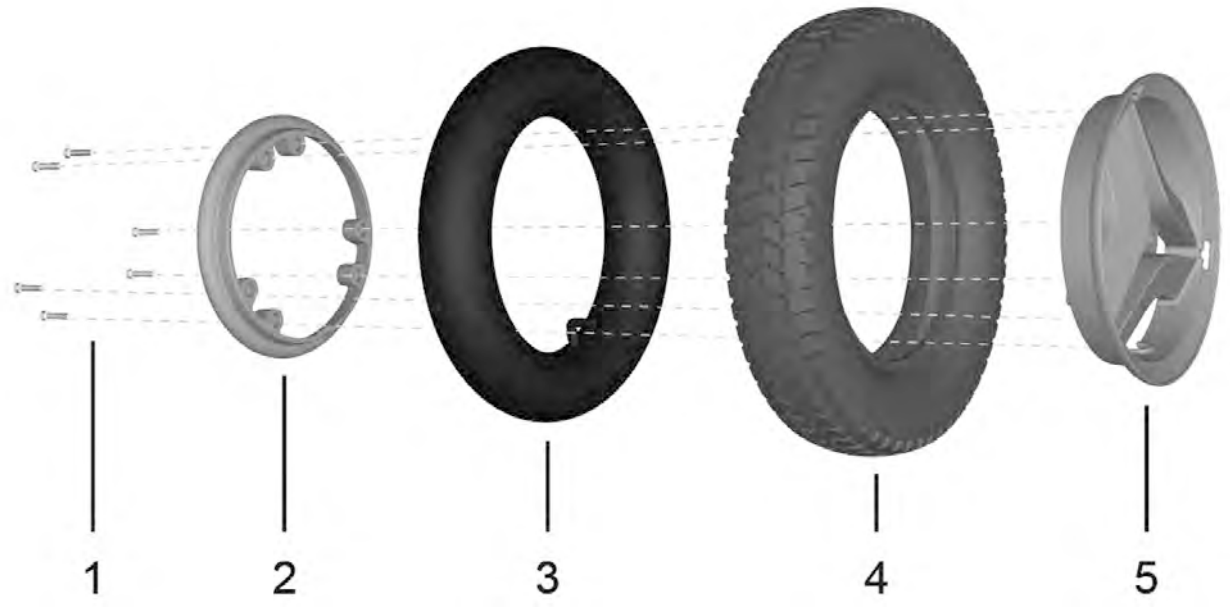

Figure 42. Assembling a tire to a split rim.

Casters

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key socket 6 mm.

Removal

1. Switch off the main power switch on the control panel.
2. Lift the wheelchair chassis and support it on blocks so that the wheel is off the ground.
3. Remove the hub cap (4) by carefully levering it out using a screw driver.
4. Remove the screw (3) and the washer (2).
5. Pull the wheel off the shaft.

Assembly

1. Check that the wheel shaft and rim are undamaged. Clean as necessary to remove dirt and rust. Replace damaged parts.
2. Assemble the wheel onto the axle with the use of hand force only. Make sure the rim is fully seated upon the axle.
3. Assemble the washer (2) onto the screw (3) and secure the wheel.

⚠ CAUTION!

Tighten the screw using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs**
Do not use a Pneumatic impact wrench.

⚠ WARNING!

The screw must be used once only. Removed screw is not allowed to be reassembled.
Other types of screws or washers are not to be used.
Do not use any other type of thread lock.

4. Assemble the hubcap (4).

Items

1. Spacer
2. Wheel
3. Washer, 8,5x23x3
4. Screw, ISO 4762 M8x16 10.9 Fe/Zn
5. Hub cap

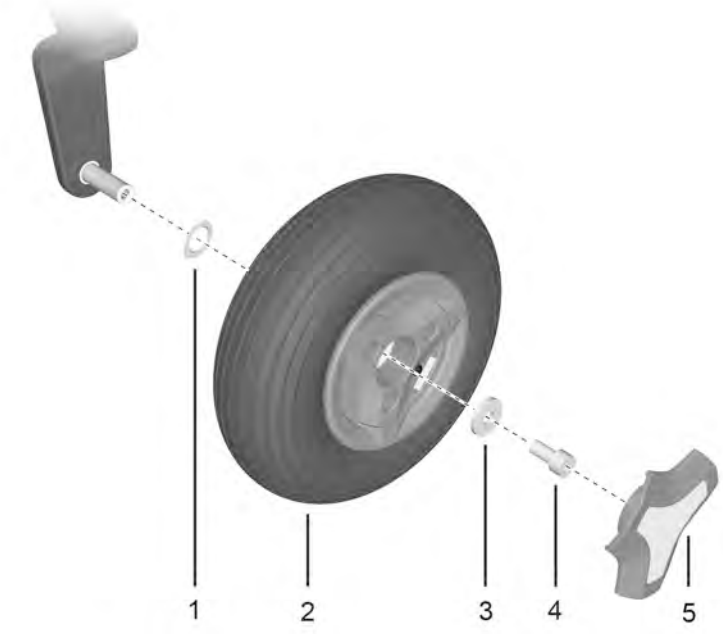

Figure 43. Assembly of rim.

Taking the rim apart

1. Switch off the main power switch on the control panel.
2. Lift the wheelchair chassis and support it on blocks so that the wheel is off the ground.
3. Remove the wheel. See *Removal*, Page 31.
4. Remove the three bolts with nuts which holds the inner and outer parts of the rim together, see fig. 44.
5. Take the rim apart.

Assembly

Assemble in the reverse order.

1. Fit the two rim halves (2 & 4) together with tire (3).
2. Tighten the three screws using a torque wrench.
   Tightening torque: 9.8 Nm / 7.2 Ft/lbs
3. Fit the wheel on to the wheelchair. See *Assembly*, Page 31.

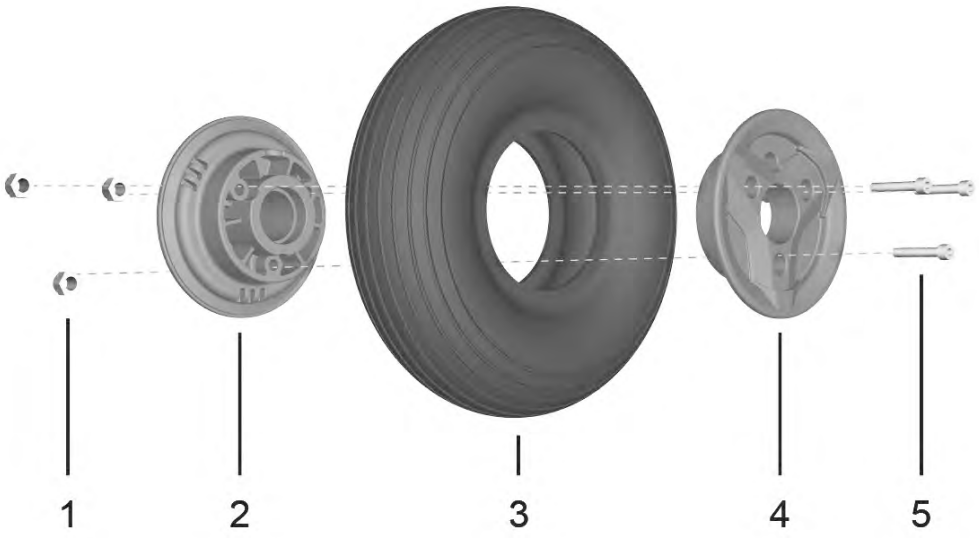

Figure 44. Rim with tire.

Filling with air

Check at regular intervals that the wheelchair's tires have the prescribed tire pressure. An incorrect tire pressure can cause deterioration in stability and manoeuvrability, plus extremely low air pressure can give rise to abnormal wear as well as shorter driving distances. So check regularly to see that the tires are maintained at a pressure of 200–250 kPa / 2–2.5 bar / 29–36 psi.

1. Unscrew the plastic cap on the air valve of the tire.
2. Connect the compressed air nozzle to the air valve and adjust the tire pressure to the prescribed level.

⚠ WARNING!

The recommended air pressure for front/rear tires is 200–250 kPa / 2–2.5 bar / 29–36 psi. Overfilling causes a risk of explosion. Incorrect tire pressure can involve a deterioration of stability and manoeuvrability, so check regularly that the tire contains the prescribed air pressure.
If the wheel bolt is removed for tire service, replace it with a new, unused part from Permobil and tighten the bolt to the recommended torque. Also, inspect the drive axle and wheel rim for any damage. Damage to either part can cause the wheel bolt to loosen or fracture. Permobil recommends that wheel bolts be used only one time.

Figure 45. Filling Valve on Drive Wheel.

Support wheels

For this task the following tools are necessary:

- 1 Allen key 5 mm.
- 1 Spanner 13 mm.

Support wheels may be fitted in three different positions; low, medium and high.

General

Low

With the support wheels fitted in the lower position, low, the wheelchair inclines less before the support wheels meet the ground, but the accessibility of the wheelchair is reduced somewhat.

Medium

The support wheels are fitted as standard in the medium position. With the support wheels fitted in the medium position, the wheelchair inclines slightly more before the support wheels meet the ground, but the accessibility of the wheelchair is increased somewhat.

High

This position produces the best accessibility, but it also means that the wheelchair may incline more before the support wheels meet the ground, which the user may find unpleasant.

Removal

1. Switch off the main power switch on the control panel.
2. Remove the screw. See fig. 46.

⚠ WARNING!

Removing the support wheels entails an increased risk of the wheelchair tipping over. The wheelchair must not be driven when the support wheels are not fitted.

Fitting

1. Switch off the main power switch on the control panel.
2. Fit the wheel with the screw, washer and nut in the desired position. See fig. 46.

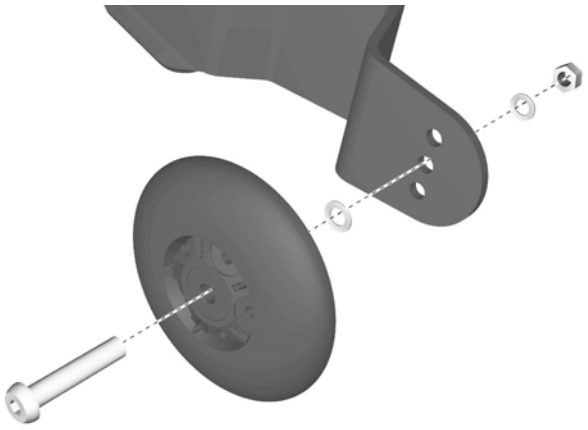

Figure 46. Support wheel.

Support wheel unit

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key socket 6 mm.

Removal

1. Switch off the main power switch on the control panel.
2. Remove the drive wheel on the side in question. See. *Drive wheels*, Page 29.
3. Remove the three screws holding the support wheel unit. See fig. 47.

Assembly

1. Assemble the support wheel unit using the three screws. Tighten the screws using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs** See fig. 47.
2. Assemble the drive wheel on the side in question. See. *Drive wheels*, Page 29.

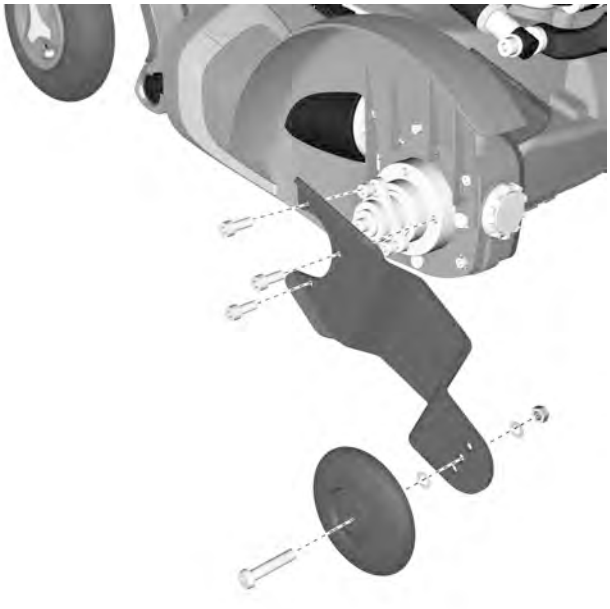

Figure 47. Support wheel unit.

Link arms

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key socket 6 mm.

Removal of rear link arms

1. Switch off the main power switch on the control panel.
2. Lift up and chock up the wheelchair chassis so that the wheel in question is free of the ground.
3. Remove the shock absorber from the link arm. It is fitted with one screw (1) and washer (2). See fig. 48.
4. Remove the cover (3) from the link arm by pulling it straight out. If necessary, carefully lever it out using a screwdriver in the slot on the cap. See fig. 48.
5. Remove the link arm (6), it's fitted with the screw (4) and the washer (5). See fig. 48.

For removal of wheel forks and wheels, see the respective chapters.

Assembly of rear link arms

Assemble in the reverse order.

1. Check that the shaft and link arm are undamaged. Clean as necessary to remove dirt and rust. Replace damaged parts.
2. Make sure the washer (7) is mounted on the axle. See fig. 48.
3. Assemble the link arm (6) onto the axle with the use of hand force only. Make sure the link arm is fully seated upon the axle. See fig. 48.
4. Fit the screw (4) and the washer (5). Tighten the screw using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs**See fig. 48.
5. Fit the shock absorber to the link arm. It is fitted with one screw (1) and washer (2). Tighten the screw using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs**See fig. 48.
6. Fit the cover (3) on to the link arm by pushing it straight in. See fig. 48.

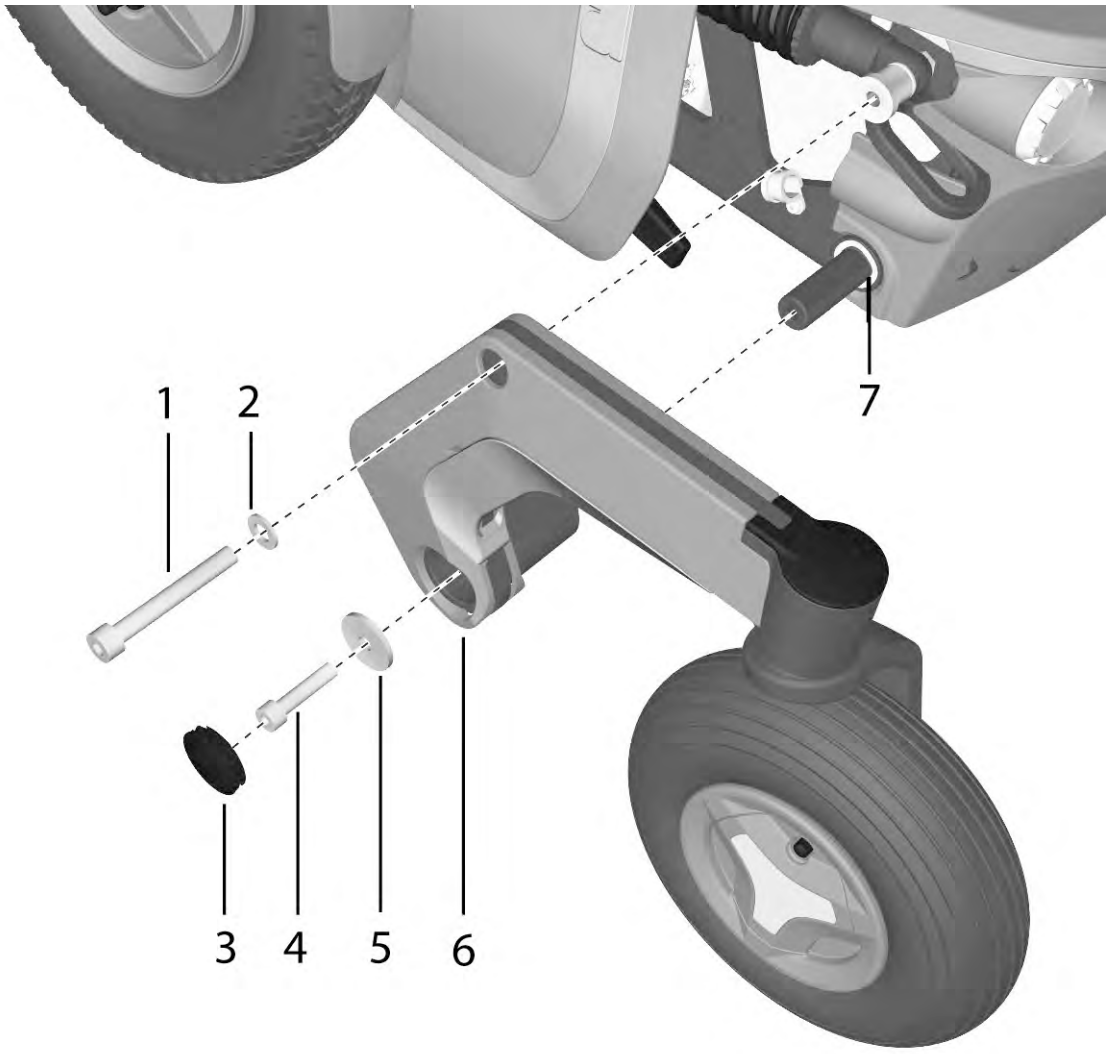

Figure 48. Fitting/removing the Rear Link Arm.

Removal of front link arms

1. Raise the seat to the highest position. If the seat lift does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised/lowered manually, see *Manual operation of AP Elevator*, Page 53.
2. Switch off the main power switch on the control panel.
3. Lift up and chock up the wheelchair chassis so that the wheel in question is free of the ground.
4. Remove the drive wheel. See *Drive wheels*, Page 29.
5. If the wheelchair is equipped with support wheels, remove them. See *Support wheel unit*, Page 36.
6. Remove the drive package covers. See *Removal of the drive package covers including the front fender*, Page 18
7. Remove the cover (7) from the link arm. See fig. 49.
8. Remove the shock absorber from the link arm. It is fitted with one screw (3) and washer (2). See fig. 49.
9. Remove the link arm (4), it's fitted with the screw (6) and the washer (5). See fig. 49.

For removal of drive motor, see *Drive motors*, Page 45.

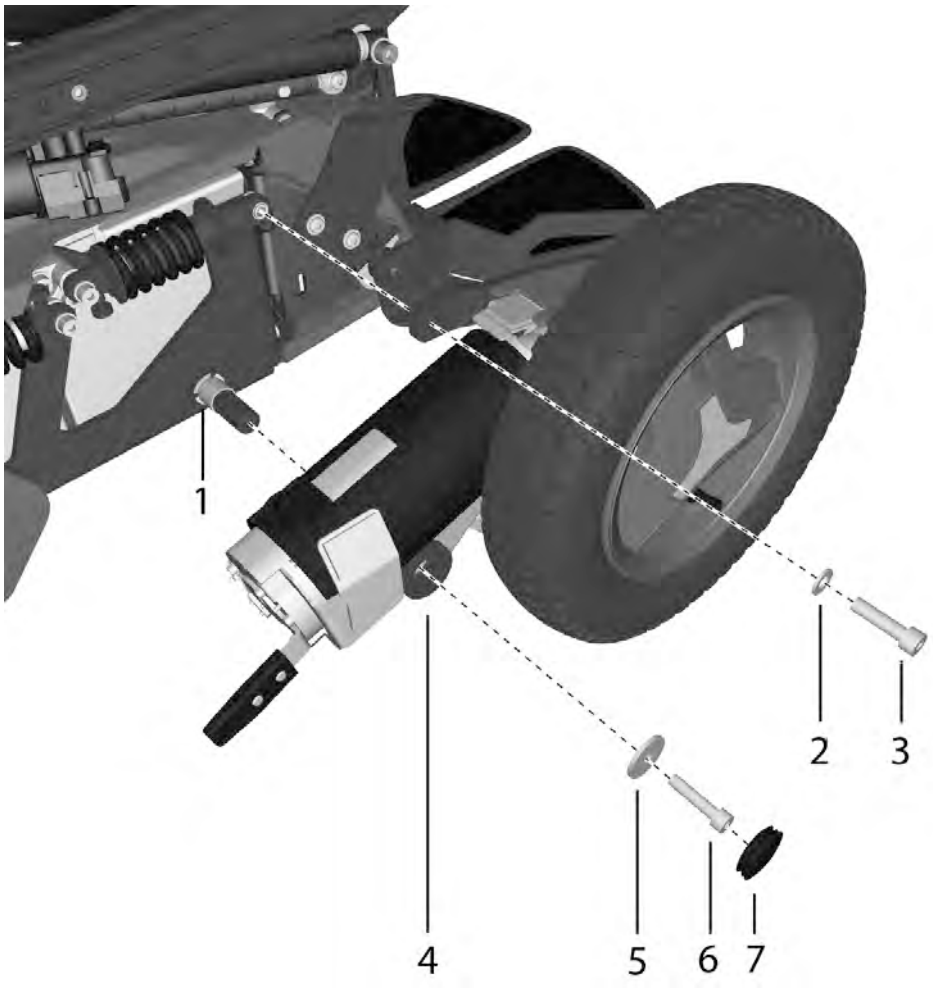

Figure 49. Fitting/removing the Front link arm

Assembly of front link arms

Assemble in the reverse order.

1. Check that the axle and link arm are not damaged. If necessary, clean to remove dirt and rust. Replaced damaged parts.
2. Make sure the washer (1) is mounted on the axle. See fig. 48.
3. Fit the link arm (4) on the axle using just your hands. Check that the link arm is fully located on the axle. See fig.50.
4. Fit the screw (6) and washer (5). Tighten the screw with a torque wrench. **Tightening torque: 24Nm / 17.7 Ft/lbs** See fig.50.
5. Fit the shock absorber on to the link arm. It is fitted with one screw (3) and washer (2). See fig.50. Tighten the screw with a torque wrench. **Tightening torque: 24Nm / 17.7 Ft/lbs**
6. Fit the cover (7) on to the link arm. See fig.50.
7. Fit the drive package covers. See *Assembly of the drive package covers including front fender*, Page 20.
8. If the wheelchair is equipped with support wheels, refit them. See *Support wheel unit*, Page 36.
9. Fit the drive wheel. See *Drive wheels*, Page 29.

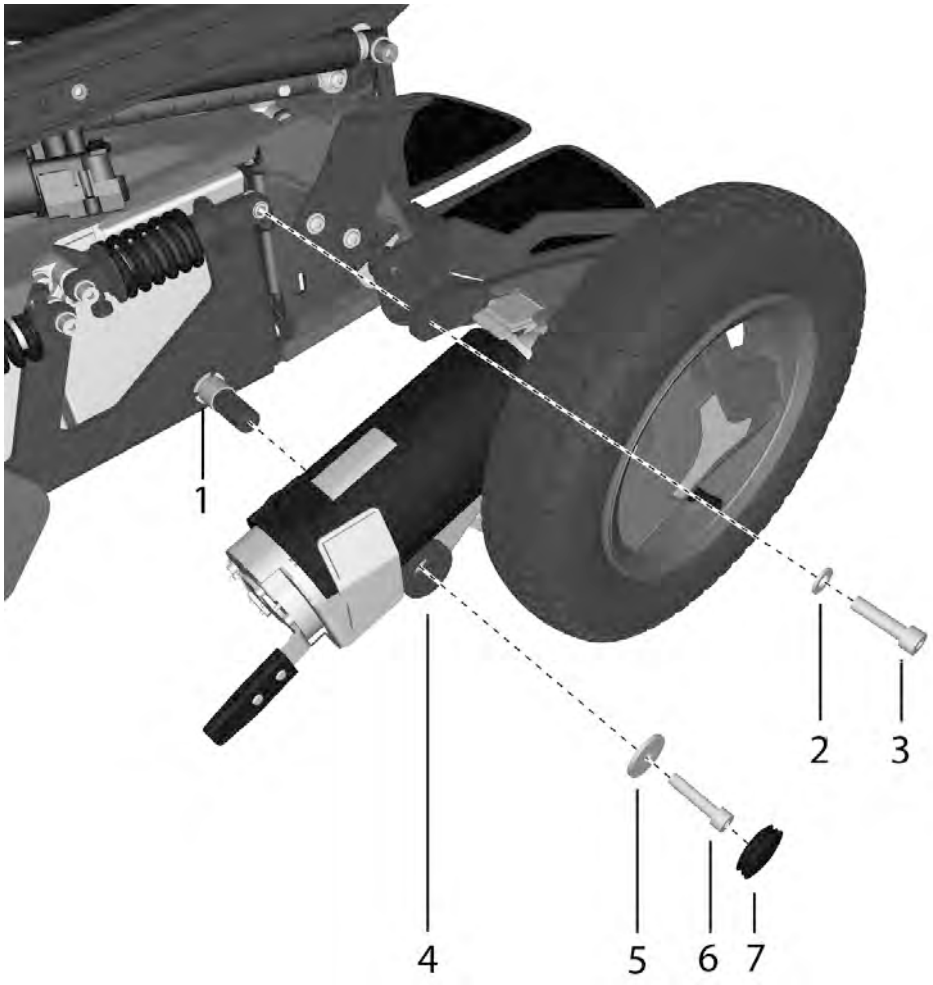

Figure 50. Fitting/removing the Front link arm

Friction brakes

The casters are equipped with friction brakes working as anti flutter devices.

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Deep well socket 13 mm.

Removal

1. Switch off the main power switch on the control panel.
2. Remove the cover (1) on the link arm. See fig 51.
3. Remove the nut (2) and washer (3). See fig 51.
4. Remove the adjustment unit (4) and o-ring (6).
5. Remove the friction brake screw (5) and the friction brake plate (7).

Assembly

Assemble in the reverse order.

1. If needed, clean the friction brake parts and the link arm bearing house before the friction brake is fitted.
2. Apply Thread Lock Loctite 243 on the lower part of the friction brake screw (5).
3. Assemble the friction brake plate (7) and the friction brake screw (5), tighten the screw using a torque wrench.**Tightening torque: 24Nm / 17.7 Ft/lbs**.
4. Lubricate the o-ring (6) and friction brake plate (7) with Friction brake grease, order no: 1820405.
5. Assemble the o-ring (6) on the friction brake plate (7).
6. Lubricate the adjustment unit (4) with Friction brake grease, order no: 1820405
7. Assemble the adjustment unit (4) by fitting it onto the friction brake screw (5), make sure it is fitted properly on the hex head.
8. Assemble the washer (3) and the lock nut (2).
9. Tighten the lock nut on the friction brake screw until their tops are flush with each other.
10. Adjust the friction brake if needed. See *Friction brake adjustment*, Page 141
11. Fit the cover (1) on top of the link arm. See fig 51.

⚠ CAUTION!

Do not use a Pneumatic impact wrench.
Other types of screws or washers are not to be used.
Do not use any other type of thread lock.

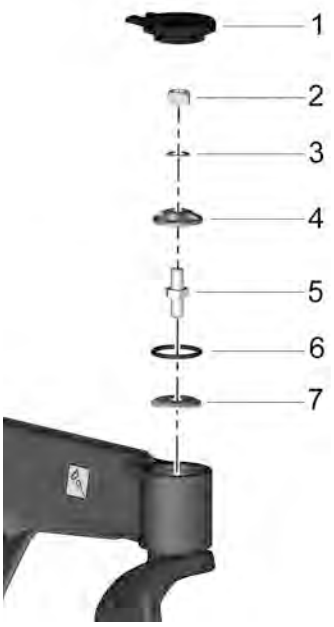

Figure 51. Friction brake.

Wheel Forks

For this task the following tools are necessary:

- 1 Torque wrench.
- 1 Deep well socket 13 mm.

Removal

1. Switch off the main power switch on the control panel.
2. Lift up and chock up the wheelchair chassis so that the wheel in question is free of the ground.
3. In order to remove the wheel fork, the friction brake must be removed. See *Friction brakes*, Page 41.
4. Remove the wheel fork (12) by pulling it downwards. See fig.

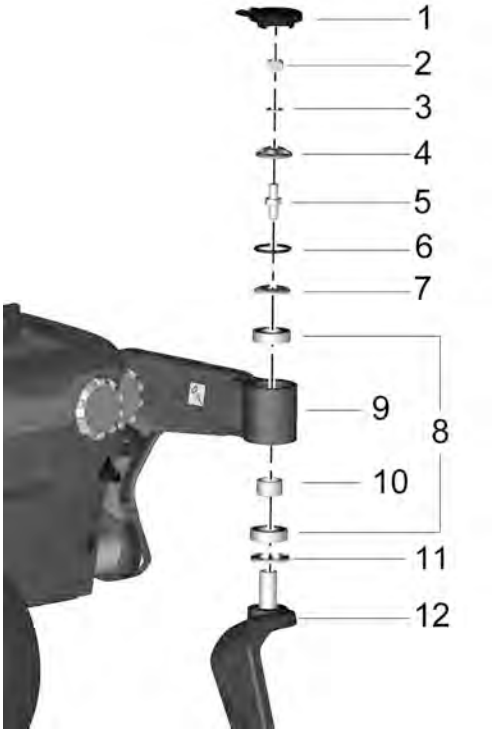

Figure 52. Wheel fork with friction brake.

Items

1. Cover
2. Nut
3. Washer
4. Adjustment unit
5. Friction brake screw
6. O-ring
7. Friction brake plate
8. Bearing, 6002-2RS1 (15x32x9)
9. Link arm
10. Spacer, Ø16xØ22x12,5
11. Washer
12. Wheel fork

Assembly

1. Check that the wheel fork and link arm with bearings and friction brake are not damaged. If necessary, clean to remove dirt and rust. Replaced damaged parts. Make sure the washer (11) is mounted on the wheel fork.
2. Fit the wheel fork (12) on the link arm (9) using just your hands. Check that the wheel fork is fully located on the link arm.
3. Fit the friction brake. See *Friction brakes*, Page 41.
4. Fit the cover (1) on top of the link arm.

⚠ CAUTION!

Do not use a Pneumatic impact wrench.
Other types of screws or washers are not to be used.
Do not use any other type of thread lock.

Shock absorbers

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key socket 6 mm.
- 1 Spanner 13 mm.

Removal of front shock absorbers

1. Raise the seat to the highest position. If the seat lift does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised/lowered manually, see *Manual operation of AP Elevator*, Page 53.
2. Switch off the main power switch on the control panel.
3. Remove the chassis covers and drive package covers. See page 13.
4. Lift up and chock up the wheelchair chassis so that the wheel in question is free of the ground.
5. Remove the shock absorber, it's fitted with two screws and washers. See fig. 53.

Assembly of front shock absorbers

1. Fit the shock absorber using the two screws and washers. Tighten the screws using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs** See fig. 53.
2. Adjust the shock absorber spring force. See *Shock absorber adjustment*, Page 140.

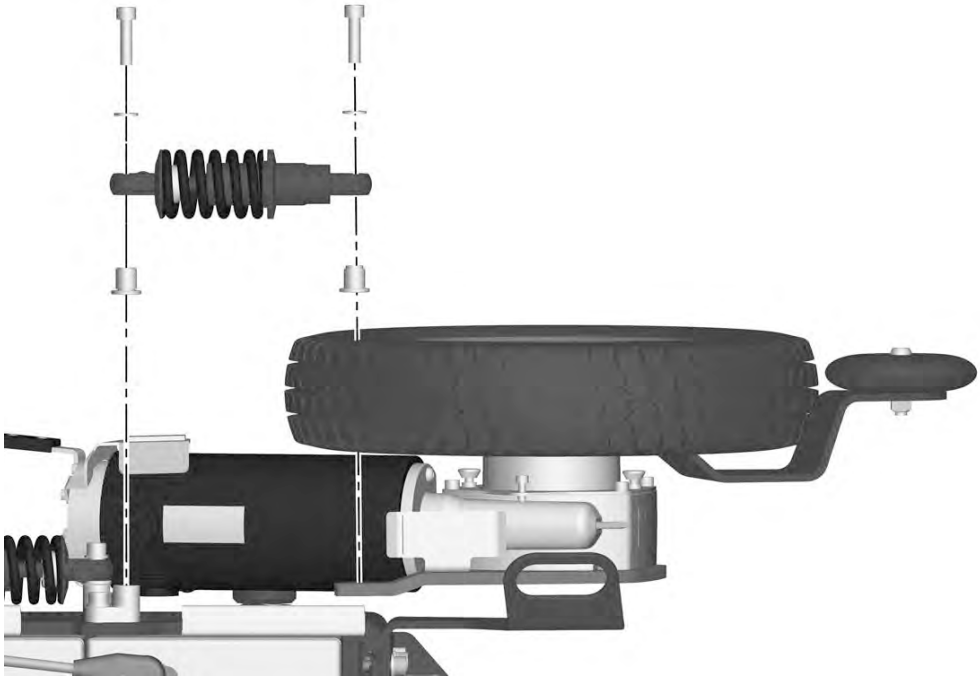

Figure 53. Fitting/removing the front shock absorber.

Removal of rear shock absorbers

1. Raise the seat to the highest position. If the seat lift does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised/lowered manually, see *Manual operation of AP Elevator*, Page 53.
2. Switch off the main power switch on the control panel.
3. Remove the chassis covers and drive package covers. See page 13.
4. Lift up and chock up the wheelchair chassis so that the wheel in question is free of the ground.
5. Remove the shock absorber, it's fitted with two screws and washers and a nut. See fig. 53 *Fitting/removing the front shock absorber.*.

Assembly of rear shock absorbers

Assemble in the reverse order.

1. Fit the shock absorber using the two screws and washers and nut. Tighten the screws using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs** See fig. 53.
2. Adjust the shock absorber spring force. See *Shock absorber adjustment*, Page 140.

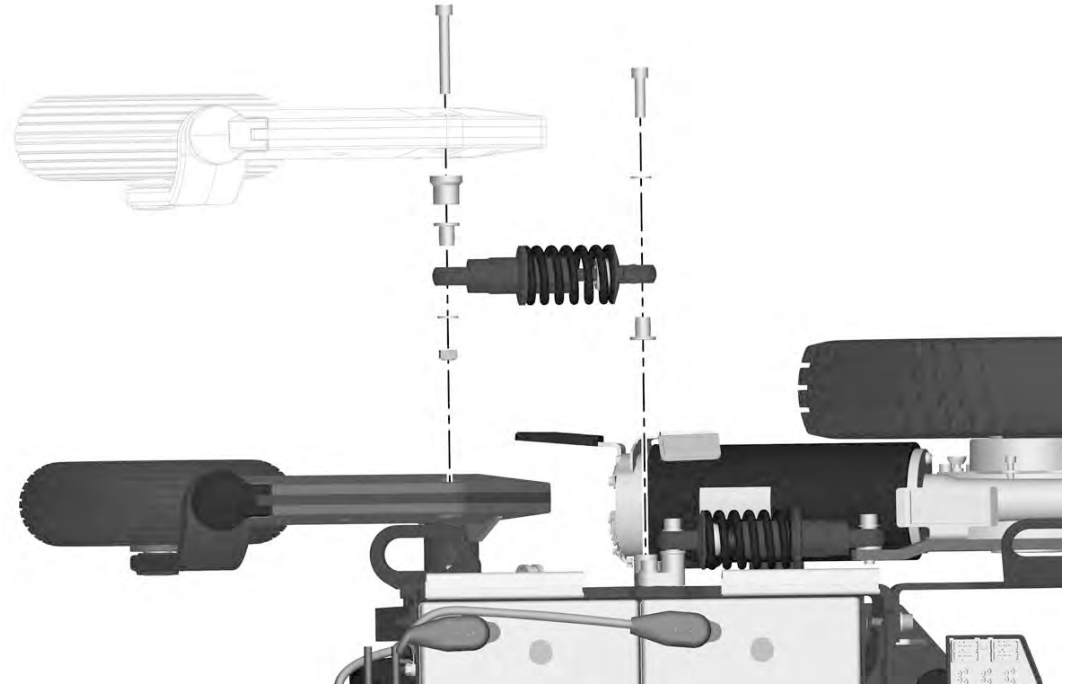

Figure 54. Fitting/removing the front shock absorber.

Drive motors

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key socket 6 mm.
- 1 Allen key 5 mm.
- 1 Allen key 4 mm.

Removal of drive motors

1. Raise the seat to the highest position. If the seat lift does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised/lowered manually, see *Manual operation of AP Elevator*, Page 53.

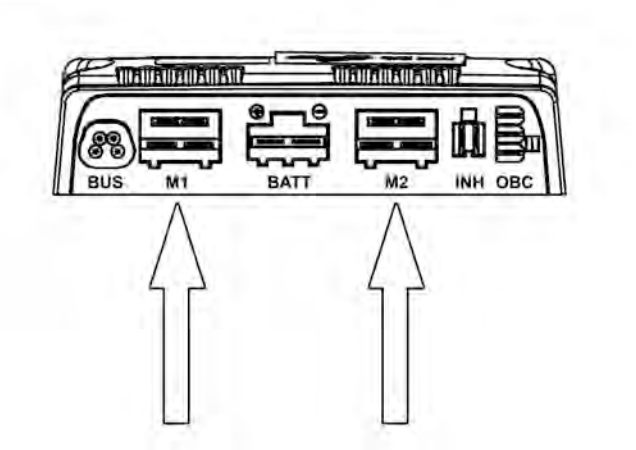

Figure 55. Disconnect the magnetic wheel lock and drive motor cabling from the Power Module.

2. Switch off the main power switch on the control panel.

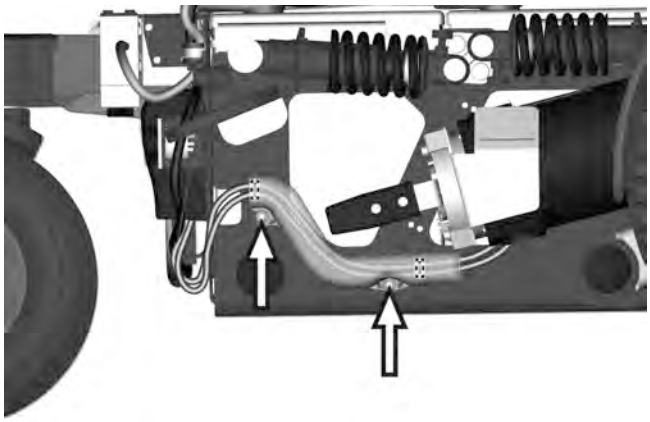

Figure 56. The drive motor cable and the wheel lock cable are fitted with a cable cover.

3. Remove the chassis covers. See *Covers*, Page 13.
4. Lift up and chock up the wheelchair chassis so that the wheel in question is free of the ground.
5. Remove the drive wheel. See *Drive wheels*, Page 29.
6. Disconnect the magnetic wheel lock and drive motor cabling from the Power Module. See fig. 55.
7. Remove the cable cover by undoing the rear and removing the front screw that holds the cable cover. See fig. 56.
8. Remove the drive motor, it's fitted with four screws. See fig. 57.

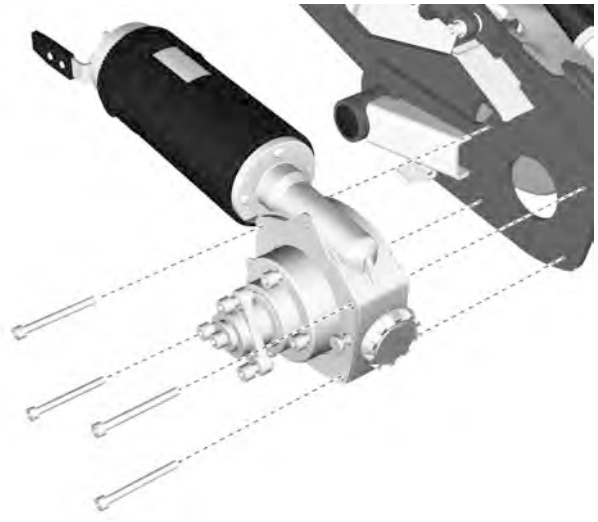

Figure 57. Fitting/removing the Drive motor.

Assembly

Assemble the drive motor in the reverse order.

1. Fit the drive motor with the four screws. See fig. 58.

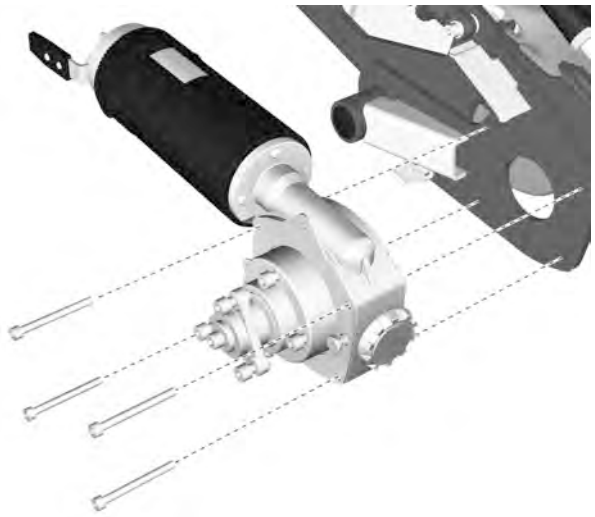

Figure 58. Fitting/removing the Drive motor.

2. Fit the cable cover onto the drive motor cable/wheel lock cable. See fig. 59

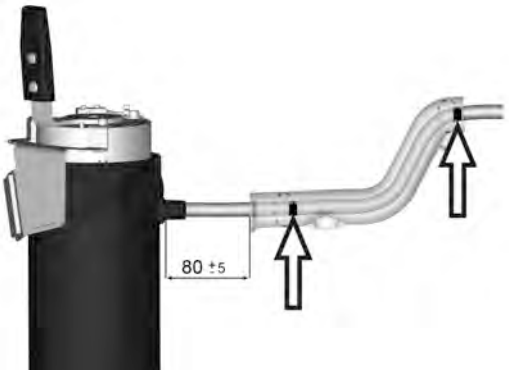

Figure 59. Fitting of the Drive motor cable cover.

3. Fit the cables with the cable cover using the two screw that holds the cable cover to the chassis. See fig. 60.

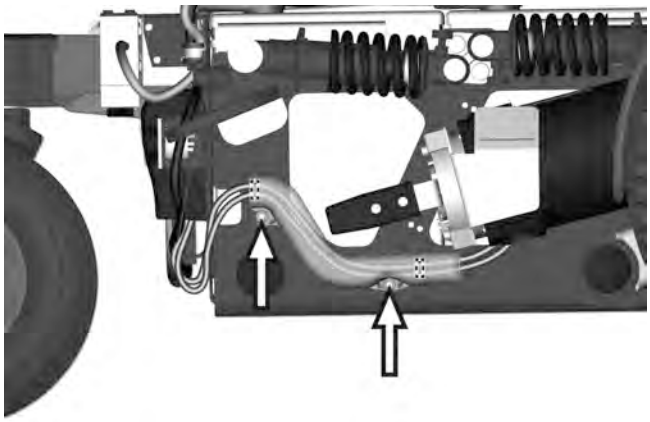

Figure 60. The drive motor cable and the wheel lock cable are fitted with a cable cover.

4. Connect the magnetic wheel lock and drive motor cabling to the Power Module. See fig. 61.

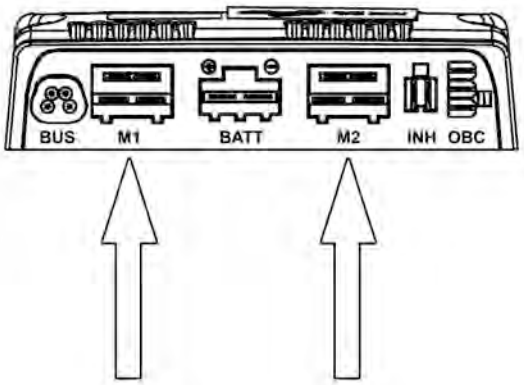

Figure 61. Connect the magnetic wheel lock and drive motor cabling to the Power Module.

5. Fit the drive wheel. See *Drive wheels*, Page 29.
6. Fit the chassis covers. See *Covers*, Page 13.

⚠ CAUTION!

Check the function of the brake release after fitting. When the brakes are released, it should not be possible to drive the wheelchair.

Magnetic wheel locks

For this task the following tools are necessary:

- 1 Allen key 3 mm.
- 1 Allen key 4 mm.

The wheelchair is equipped with a magnetic wheel locks on the left and right drive motor. The magnetic wheel locks are both equipped with a brake release lever which is used to manually release the brakes.

Removal of magnetic wheel lock

1. Switch off the main power switch on the control panel.
2. Remove the drive package covers. See *Removal of the drive package covers including the front fender*, Page 18.
3. Remove the chassis rear cover. See *Covers*, Page 13.
4. Disconnect the magnetic wheel lock at the connector on the cable. See fig. 62.
5. Remove the cable cover by unscrewing the two screws. See fig. 63.

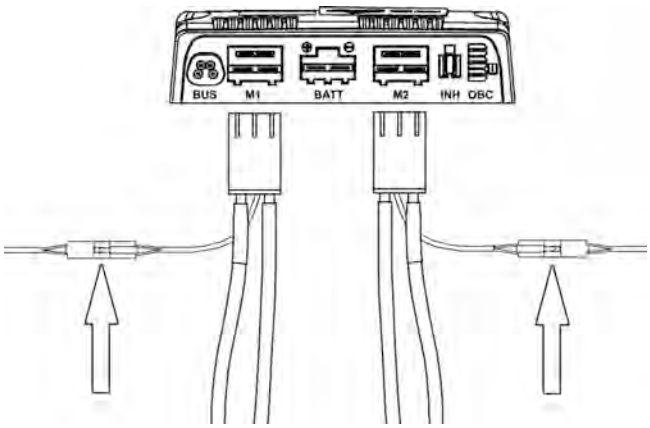

Figure 62. The connectors of the magnetic wheel locks.

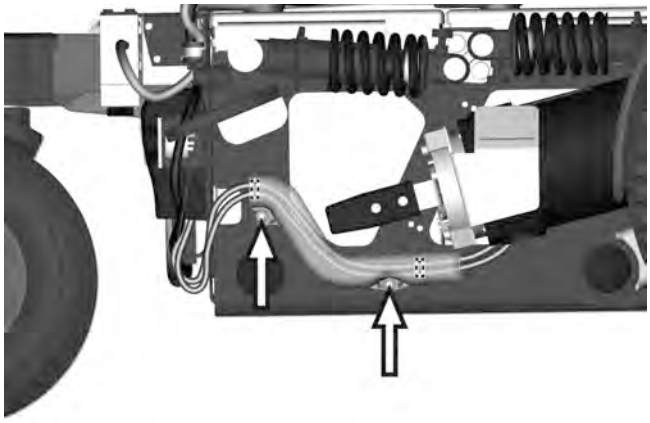

Figure 63. Remove the cable cover.

6. Remove the magnetic wheel lock, it's fitted with three screws. See fig. 64.

Figure 64. The magnetic wheel lock is fitted with three screws.

Assembly of magnetic wheel lock

Assemble in the reverse order.

1. Fit the magnetic wheel lock with the brake release lever pointing outwards using the three screws. See fig. 65.
2. The brake release lever has an end position screw which is assembled in different positions depending on if the magnetic wheel lock is assembled on the chassis right or left drive motor. On delivery of a new brake release, the end position screw is assembled on the end of the brake release lever. Fit the end position screw in the hole above the brake release lever. See fig. 66.

Figure 65. The magnetic wheel lock is fitted with three screws.

Figure 66. The brake release lever has an end position screw which is assembled in different positions depending on if the magnetic wheel lock is assembled on the chassis right or left drive motor.

3. Fit the cable to the chassis using the cable cover. See fig. 60.
4. Connect the magnetic wheel lock to the connector on the cable, next to the connector on the Power Module. See fig. 67.

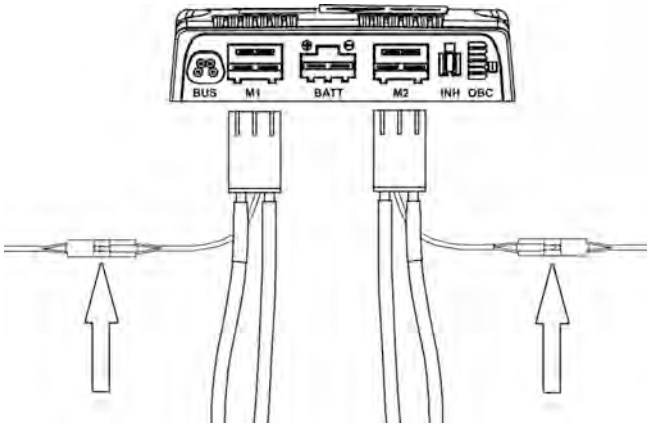

Figure 67. The contacts of the magnetic wheel locks.

5. Fit the drive package covers. See *Assembly of the drive package covers including front fender*, Page 20.

Wheel hub

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key socket 6 mm.

Removal

1. Remove the screw holding the wheel hub. See fig. 68.
2. Pull the wheel hub off the axle. If needed use a suitable puller.

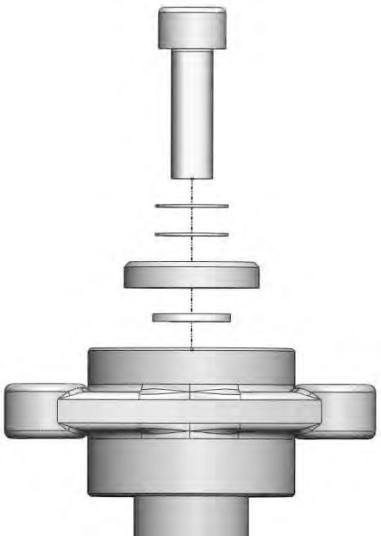

Figure 68. Remove the screw holding the wheel hub.

Assembly

1. Check the axle and key for damages.
2. Clean all parts with alcoholic cleaner.

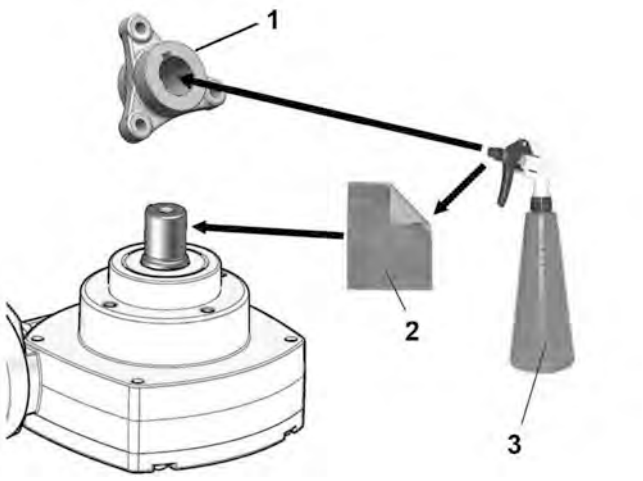

Figure 69. Clean all parts with alcoholic cleaner.

3. Fit the key onto the axle.
4. Position the hub onto the axle using just your hands and make sure the key fits the groove of the hub.

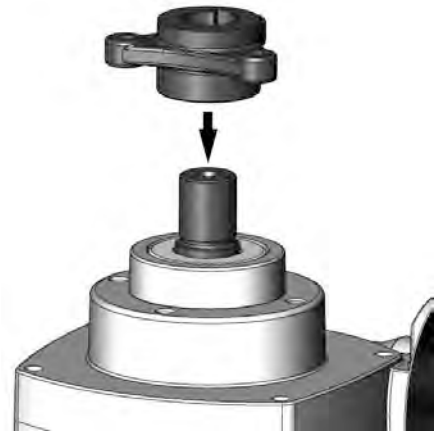

Figure 70. Position the hub onto the axle.

5. Make sure to fit the hub with the longer sleeve (11 mm.) towards the gear housing. Push the hub 3–5 mm. onto the axle.

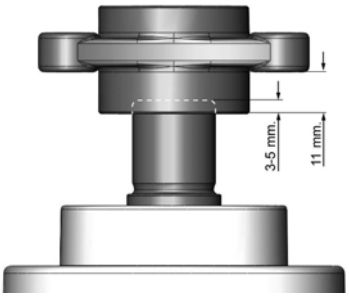

Figure 71. Make sure to fit the hub with the longer sleeve (11 mm.) towards the gear housing.

6. Apply a thin layer of Loctite 638 around the chamfer of the shaft. See fig. 72.

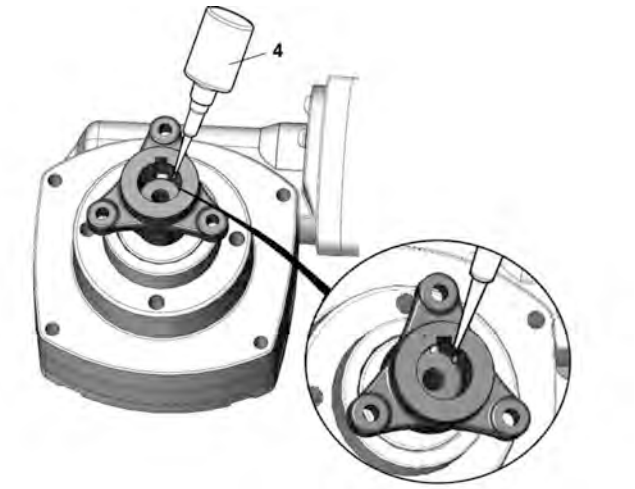

Figure 72. Apply a thin layer of Loctite 638 around the chamfer of the shaft.

7. Fit the screw with washers on the axle. Mind the assembly order of the different type of washers. Se fig. 73. Push the hub onto the axle by tightening the screw. Tighten the screws using a torque wrench. **Tightening torque: 33 Nm / 24.3 Ft/lbs**

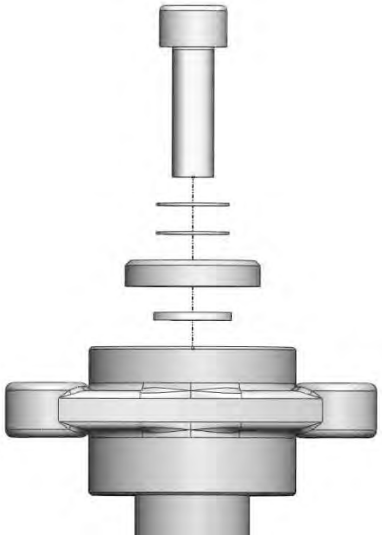

Figure 73. Mind the assembly order of the different type of washers.

AP Elevator

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key 3 mm.
- 1 Allen key socket 6 mm.
- 1 Allen key socket 8 mm.
- 1 Spanner 17 mm.
- 1 Torx key T–20

Manual operation of AP Elevator

If the AP Elevator does not work normally because the batteries are discharged or the adjustment devices are defective, the seat can be raised/lowered manually.

Prepare manual operation

1. Switch off the main power switch on the control panel.
2. Remove the seat cushion by lifting it straight up.
3. Remove the seat plates, they are fitted with four screws at the back and front edge. See fig. 74.
4. Remove the actuator from the leg rest, it is attached with one screw and a lock nut. See fig. 75.

Figure 74. The seat plates are held in place by four screws.

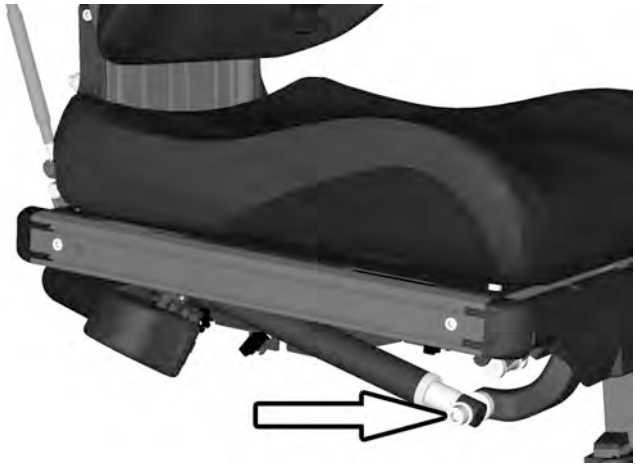

Figure 75. The actuator attachment screw.

5. Remove the leg rest's top cover by carefully pulling it straight out. See 76. If the three attachment screws of the electric motor of the seat tilt mechanism is

Figure 76. Remove the leg rest's top cover by carefully pulling it straight out.

accessible, proceed to step 9.

6. Remove the rear attachment screw of the UniTrack rail on the left and right hand side of the seat. See fig. 77.

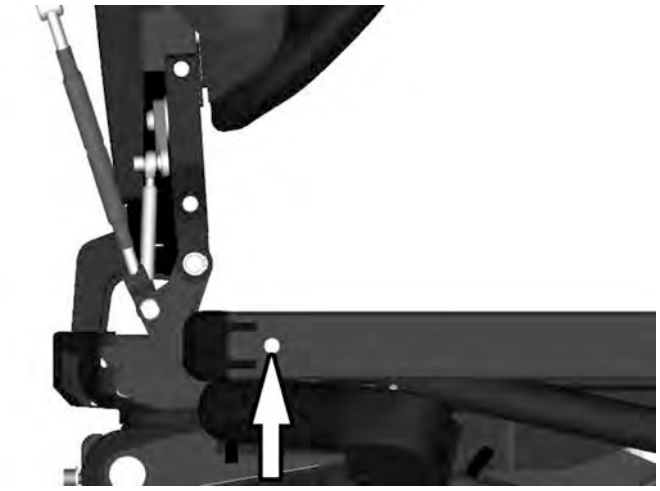

Figure 77. The rear attachment screw of the UniTrack rail.

7. Remove the seven screws marked (B) securing the Seat frames rear section, see fig. 78.

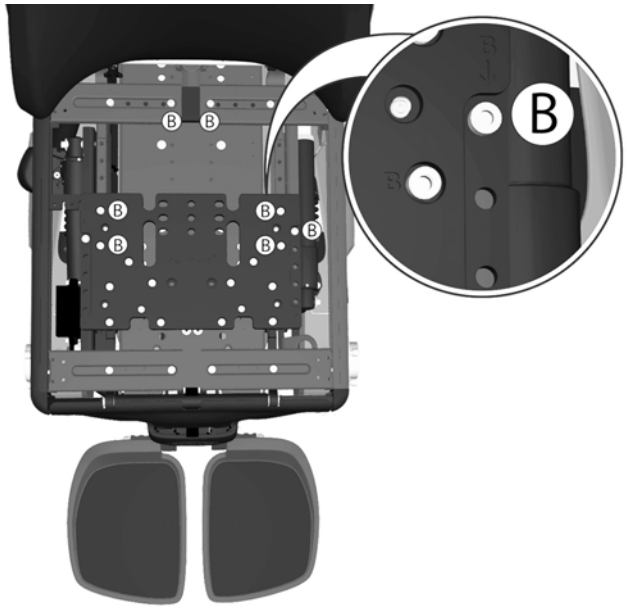

Figure 78. The position of the rear section of the Seat frame (Back rest Position) is fixed by five screws marked with the letter B.

8. Take note of the current seat depth setting with consideration to subsequent assembling. The rails with which the seat depth is adjusted are marked with the settings for each potential position. The scale is marked with "millimetres" on one side and "inches" on the other. Pull the rear section of the seat forward to uncover the three screws holding the electric motor of the seat tilt mechanism. See fig. 79.

9. Remove the electric motor of the seat tilt mechanism, it is assembled with three screws. See fig. 79. **NOTE!** The actuator has to be calibrated after refitting!

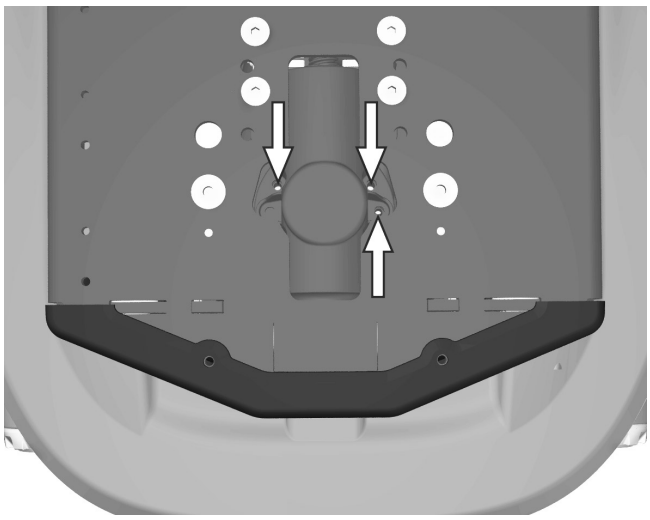

Figure 79. The electric motor of the seat tilt mechanism is assembled with three screws.

10. Remove the protective rubber cover underneath the chassis to get access to the seat elevator axle. See fig. 80. In the figure the wheelchair is shown without the front chassis cover for better view, however the front chassis cover do not need to be removed.

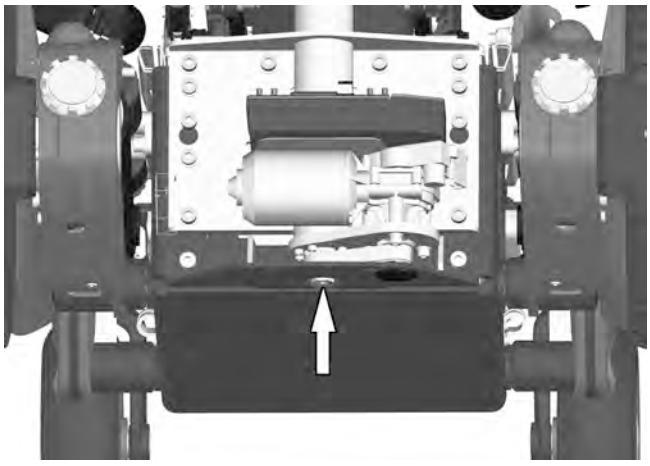

Figure 80. Remove the protective rubber cover underneath the chassis to get access to the seat elevator axle.

Manual adjustment of height and angle

1. Fold the leg rest upwards to get access to the seat elevator axle. **NOTE!** In fig. 81the seat is shown without the leg rest to get a better view. However, the leg rest do not need to be removed for this operation.
2. Use the Allen tool from the back rest to manually adjust the height of the seat elevator i.e. rotate the axle. See fig. 81.
3. Use the supplied spanner to manually adjust the angle of the seat elevator i. e rotate the seat elevator axle. It is accessed through the hole in the bottom of the chassis. See fig. 80.

Reassemble

1. Refit the protective rubber cover underneath the chassis.

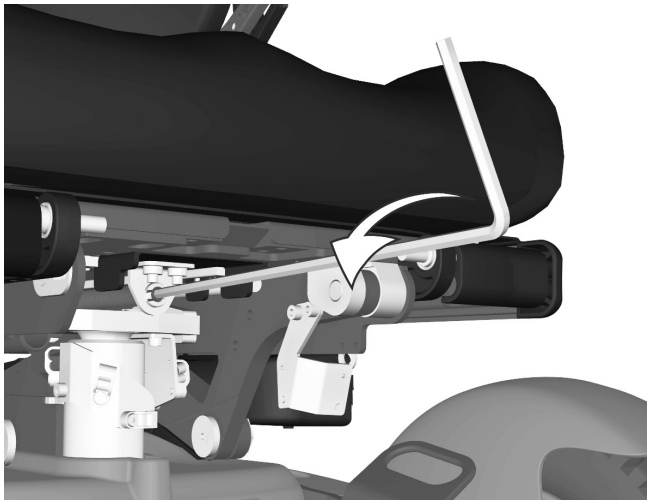

Figure 81. Use the Allen tool from the back rest to manually adjust the height of the seat elevator.

2. Refit the electric motor of the seat tilt mechanism, it is assembled with three screws. See fig. 82. **NOTE!** The actuator has to be calibrated after refitting!

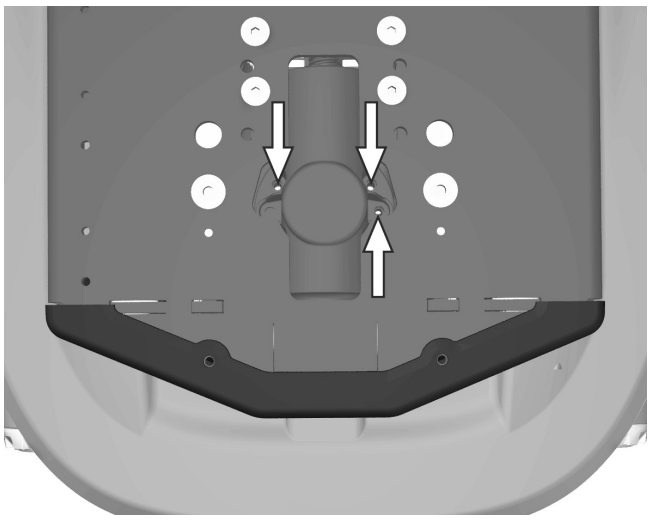

Figure 82. The electric motor of the seat tilt mechanism is assembled with three screws.

If the rear section of the seat frame hasn't been moved, proceed to step 6.

3. Pull the rear section of the seat backwards to the correct seat depth setting. Tighten the seven screws marked (B) securing the Seat frames rear section, see fig. 83.

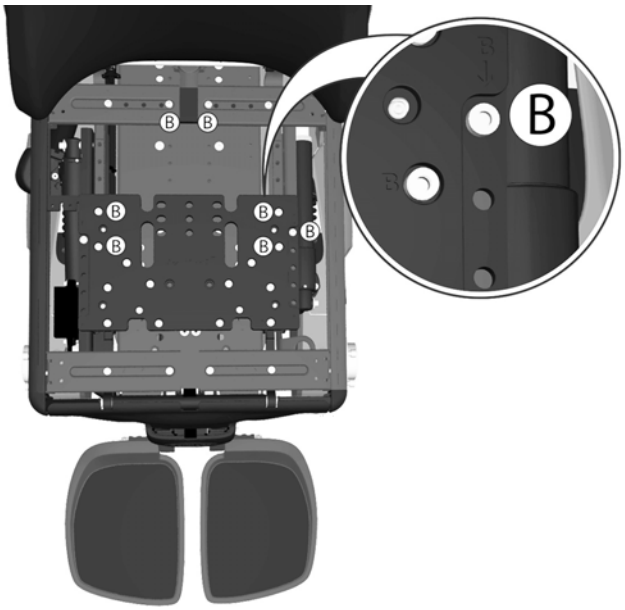

Figure 83. The position of the rear section of the Seat frame (Back rest Position) is fixed by five screws marked with the letter B.

4. Refit the rear attachment screw of the UniTrack rail on the left and right hand side of the seat. See fig. 84.

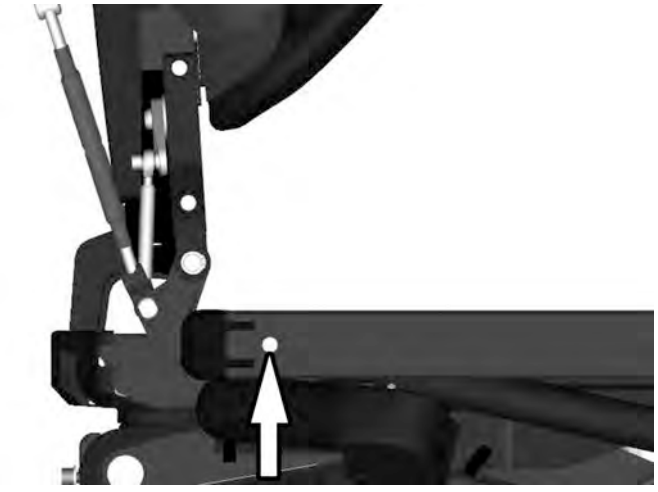

Figure 84. The rear attachment screw of the UniTrack rail.

5. Mount the leg rest's top cover by carefully pressing its bracket into place on the leg rest's axle. See fig. 85.

Figure 85. Mount the leg rest's top cover by carefully pulling it straight out.

6. Refit the actuator to the leg rest, it is attached with one screw and a lock nut. See fig. 86.

Figure 86. The actuator attachment screw.

7. Refit the seat plates, they are fitted with four screws at the back and front edge. See fig. 87.

Figure 87. The seat plates are held in place by four screws.

8. Refit the seat cushion.

Removal

1. Raise the seat lift to its highest position. To raise the seat on a chassis with an electric seat lift that does not work normally because the batteries are discharged or the adjustment device is defective, see *Manual operation of AP Elevator*, Page 53.
2. Switch off the main power switch on the control panel.
3. Set the main fuse to the Off position. See *Circuit breaker*, Page 93
4. Remove the chassis covers. See *Covers*, Page 13.
5. Remove the seat plates. See *Seat plates*, Page 109.
6. Remove the UniTrack rail on the right hand side of the seat. It is assembled with two screws. See *UniTrack rails*, Page 108.
7. Disconnect the Tilt motor cabling from the Tilt motor. Release the cable from its cable brackets on the AP-elevator. Make note of how the cable is assembled with consideration to subsequent assembling. See *AP Elevator Tilt Motor Cabling*, Page 77.
8. Disconnect the cable that connects the ISC Master Module to the contact block at the seat frame. See fig. 89. Release the cable from its cable brackets on the seat frame and AP-Elevator. Make note of how the cables are assembled on the seat frame with consideration to subsequent assembling. See *Rnet and ICS bus cable mounting*, Page 81.

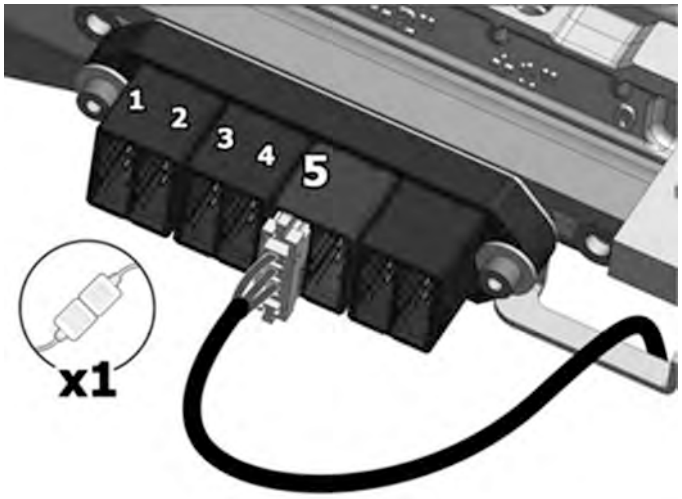

Figure 88. The Tilt Motor Cable is connected to the fifth position of the connector block.

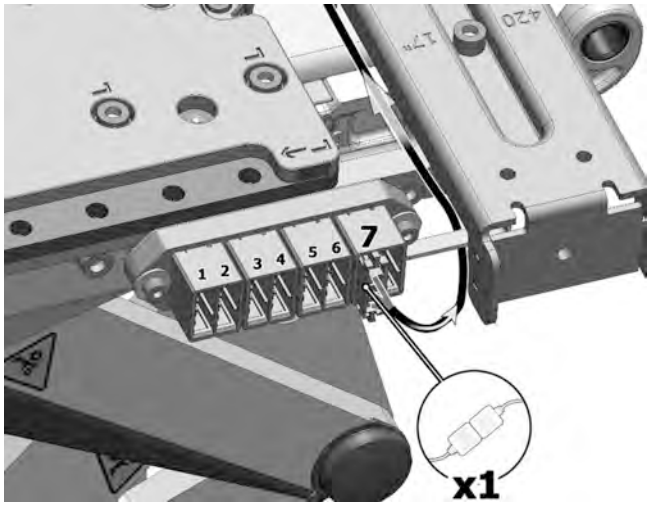

Figure 89. The ICS bus cable is connected to the seventh position of the connector block.

9. Remove the cover on the back of the back rest. It is attached with two screws. Disconnect the Rnet cable that connects the ICS Master Module to the contact block at back of the back rest. See fig. 90. Release the cable from its cable brackets on the seat frame. Make note of how the cable is assembled with consideration to subsequent assembling. See *Rnet and ICS bus cable mounting*, Page 81.

Figure 90. The contact block is located under the cover which is attached with two screws.

10. Remove the Seat. See *Seat*, Page 103.

11. Disconnect the AP Elevator cabling from the ICS Master Module. It is connected to one of the connectors J11 or J12. See fig. 91. Release the cable from its cable brackets. Make note of how the cable is assembled with consideration to subsequent assembling.

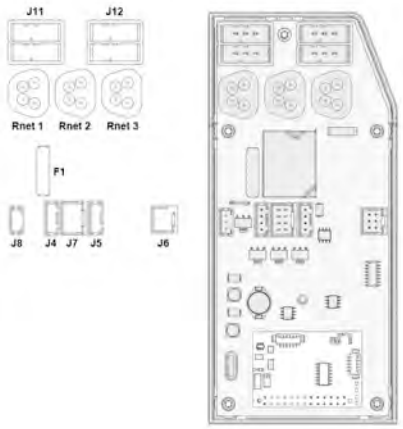

Figure 91. ICS Master Module

12. Remove the ICS Master Module. See *ICS master module*, Page 91.

13. Remove the front transport eyes, they are attached with two screws each. See fig. 92.

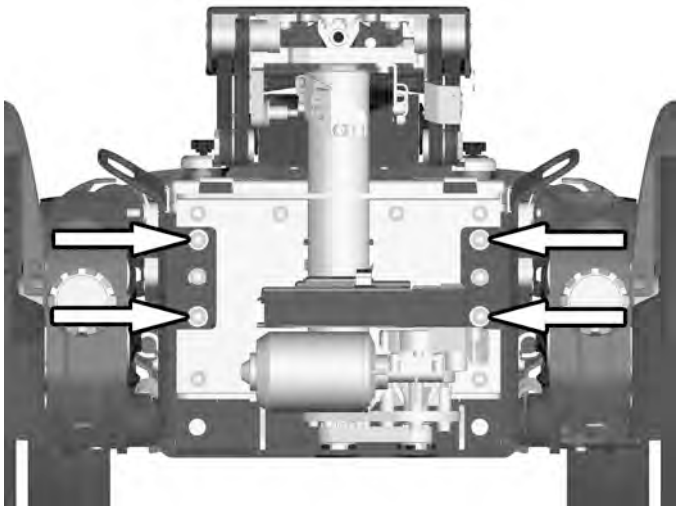

Figure 92. The front transport eyes, are attached with two screws each.

14. Remove the six screws (1) and loosen the two screws (2) holding the AP Elevator at the front. See fig. 93.

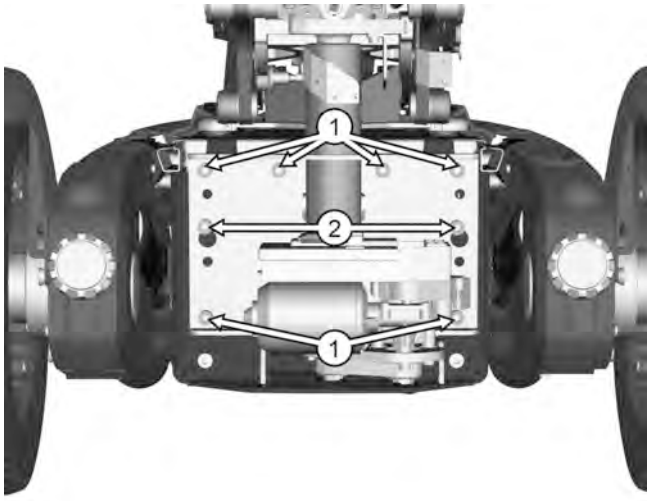

Figure 93. The AP Elevator is attached with eight screws at the front.

15. Remove the two screws (3) holding the AP Elevator at the back. See fig. 94.

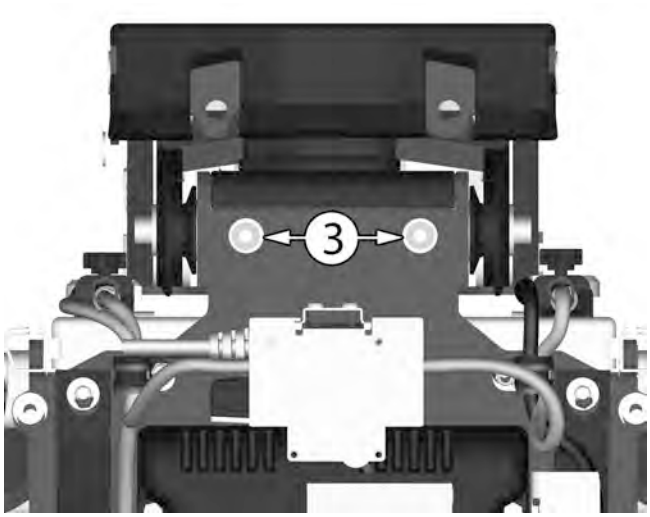

Figure 94. The two screws holding the AP Elevator at the back.

16. Lift the AP Elevator straight up out of the chassis.

Assembly

Assemble in the reverse order.

1. Fit the AP Elevator into the chassis. Fit the six screws (1) and tighten the two screws (2) holding the AP Elevator at the front. Use a torque wrench to tighten the screws. **Tightening torque: 24 Nm / 17.7 Ft/lbs.** See fig. 95.

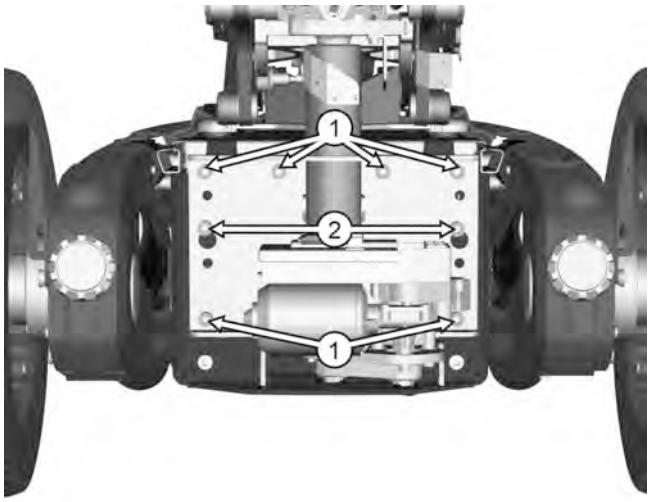

Figure 95. The AP Elevator is attached with eight screws at the front.

2. Fit the two screws (3) holding the AP Elevator at the back. Use a torque wrench to tighten the screws. **Tightening torque: 24 Nm / 17.7 Ft/lbs.** See fig. 96.

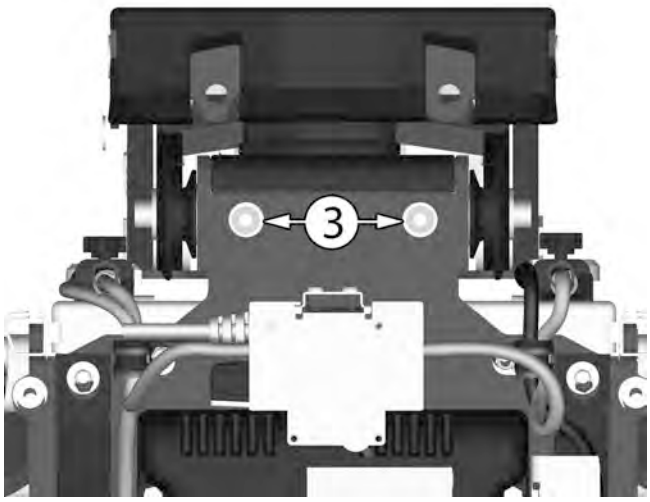

Figure 96. The two screws holding the AP Elevator at the back.

3. Refit the front transport eyes, they are attached with two screws each. Use a torque wrench to tighten the screws. **Tightening torque: 24 Nm / 17.7 Ft/lbs.** See fig. 97.

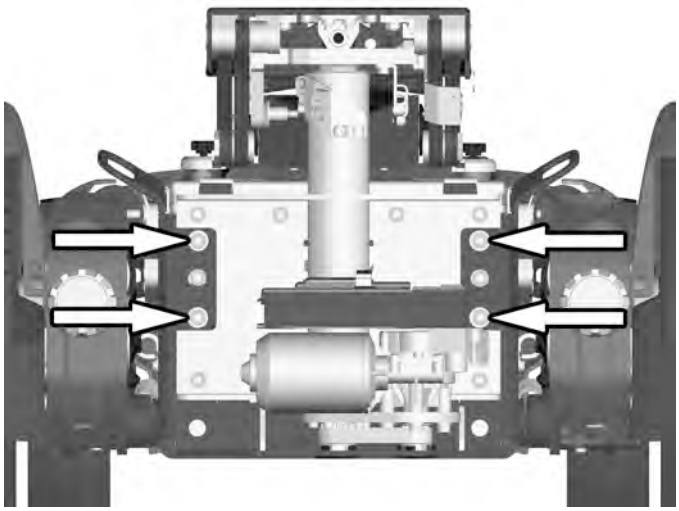

Figure 97. The front transport eyes, are attached with two screws each.

4. Mount the ICS Master Module. See *ICS master module*, Page 91.
5. Connect the AP Elevator cabling to the ICS Master Module. It should be connected to one of the connectors J11 or J12. See fig. 98.

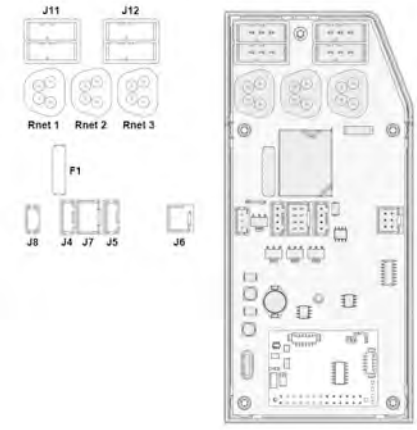

Figure 98. ICS Master Module

6. Assemble the Seat. See *Seat*, Page 103.
7. Connect the Tilt motor cabling to the contact block at the seat frame. See fig. 99. Mount the cable to its cable brackets on the right hand side of the seat. See *AP Elevator Tilt Motor Cabling*, Page 77.

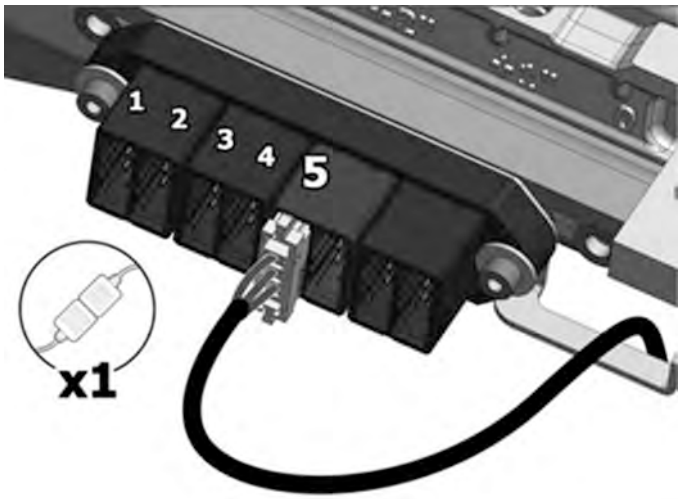

Figure 99. The Tilt Motor Cable is connected to the fifth position of the connector block.

8. Connect the cable that connects the ISC Master Module to the contact block at the seat frame. See fig. 100. Mount the cable to its cable brackets on the seat frame. See *Rnet and ICS bus cable mounting*, Page 81.

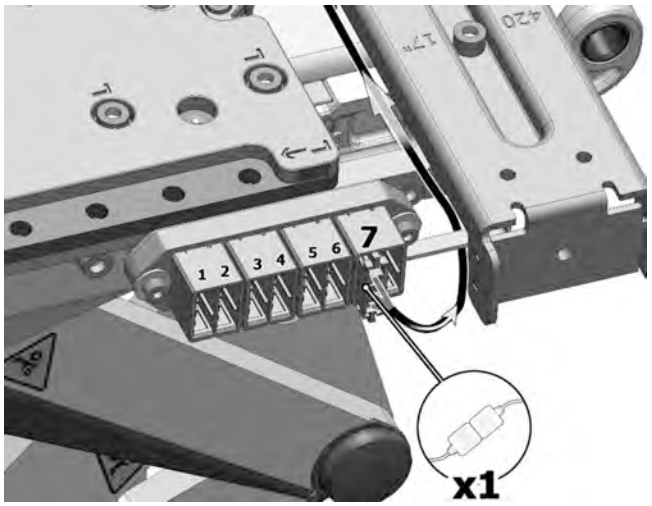

Figure 100. The ICS bus cable is connected to the seventh position of the connector block.

9. Connect the Rnet cable to the contact block at the back of the back rest. See fig. 101. Assemble the cable to its cable brackets. See *Rnet and ICS bus cable mounting*, Page 81 .

Figure 101. The contact block is located under the cover witch is attached with two screws.

10. Assemble the UniTrack rail. See *UniTrack rails*, Page 108.
11. Assemble the seat plates. See *Seat plates*, Page 109.
12. Assemble the chassis covers, see *Covers*, Page 13.
13. Set the main fuse to the On position. See *Circuit breaker*, Page 93.

AP Elevator pinch guards

For this task the following tools are necessary:

- 1 Allen key 2,5 mm.

Removal

1. Raise the seat to its highest position.
2. Switch off the main power switch on the control panel.
3. Remove the four screws holding the pinch guard to the upper arm. See fig. 102.
4. Remove the pinch guard.
5. Remove the five screws holding the pinch guard to the lower elevator arm. See fig. 103.

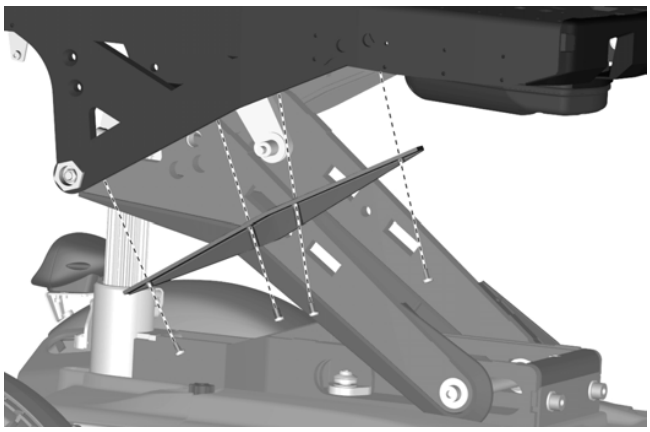

Figure 102. The pinch guard is assembled with four screws.

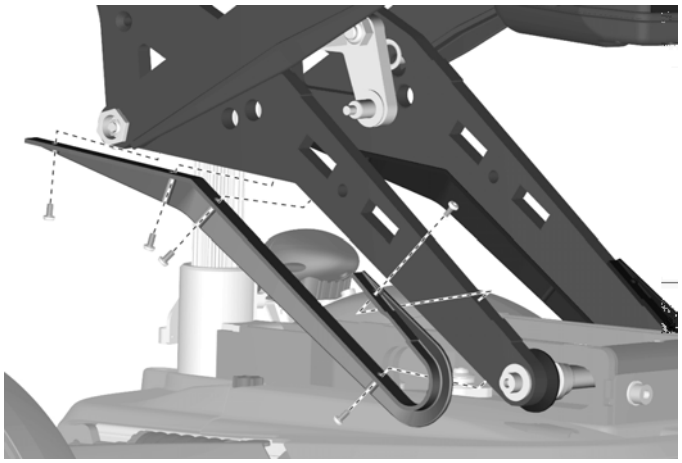

Figure 103. The pinch guard is assembled with five screws.

6. Remove the pinch guard from the lower elevator arm.
7. Remove the four screws holding the pinch guard on the top plate. See fig. 104.

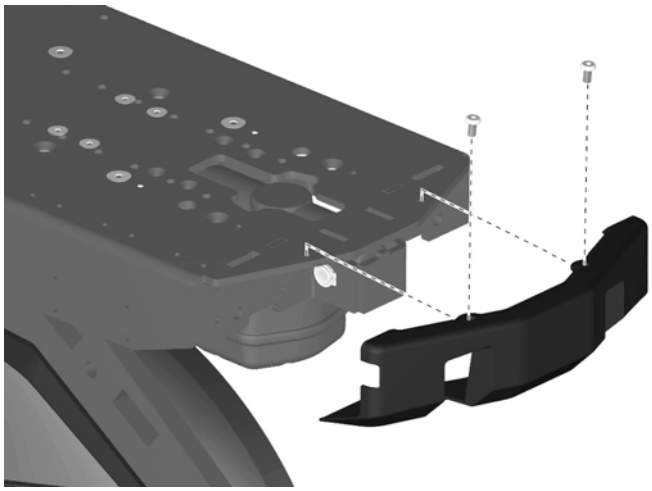

Figure 104. The pinch guard is assembled with four screws.

8. Remove the pinch guard from the plate.

Assembly

1. Fit the pinch guard to the top plate using the four screws. See fig. 105.

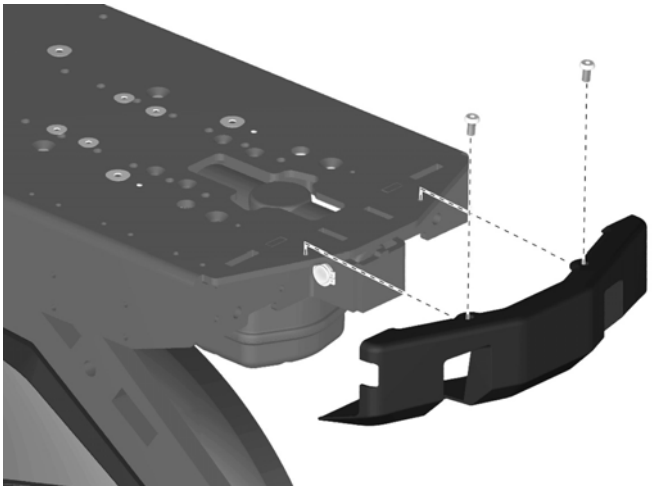

Figure 105. The pinch guard is assembled with four screws.

2. Fit the pinch guard to the lower elevator arm the five screws. See fig. 106.

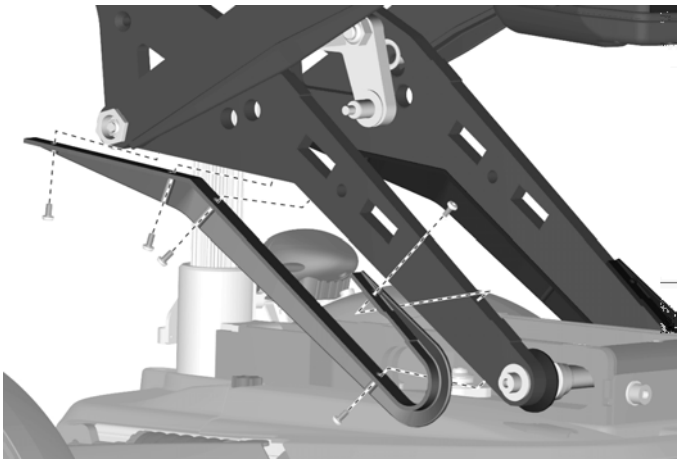

Figure 106. The pinch guard is assembled with five screws.

3. Fit the pinch guard to the upper elevator arm with the four screws. See fig. 107.

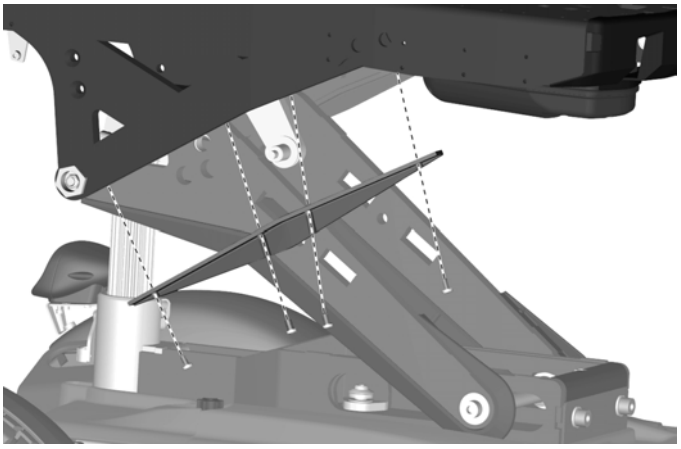

Figure 107. The pinch guard is assembled with four screws.

AP Elevator battery pole protection

Removal

1. Raise the seat to its highest position.
2. Switch off the main power switch on the control panel.
3. Remove the top chassis cover. See *Removal of the chassis covers*, Page 13.
4. Remove the battery pole protection by carefully levering its edges outwards and at the same time pull it off from the AP Elevator. See fig. 108.

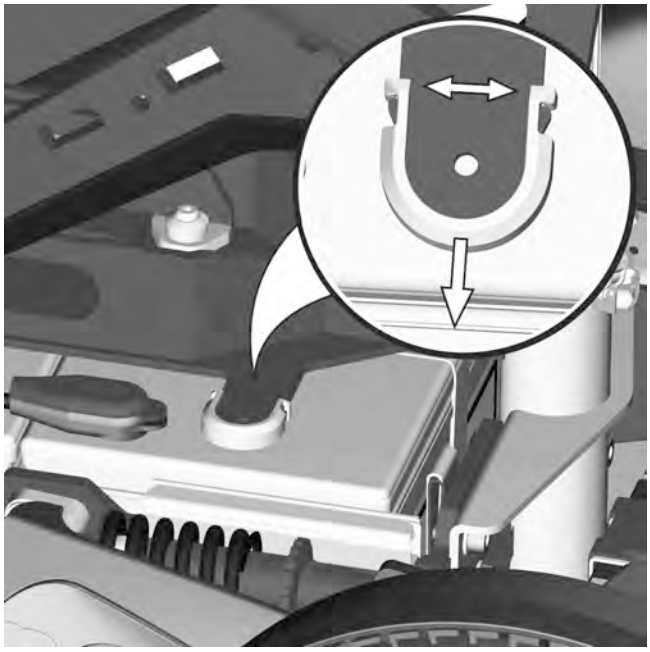

Figure 108. AP Elevator battery pole protection

Assembly

1. Assemble the battery pole protection. Push the battery pole protection on to the AP Elevator. See fig. 109.
2. Assemble the top chassis cover. See *Assembly of the chassis covers*, Page 15.

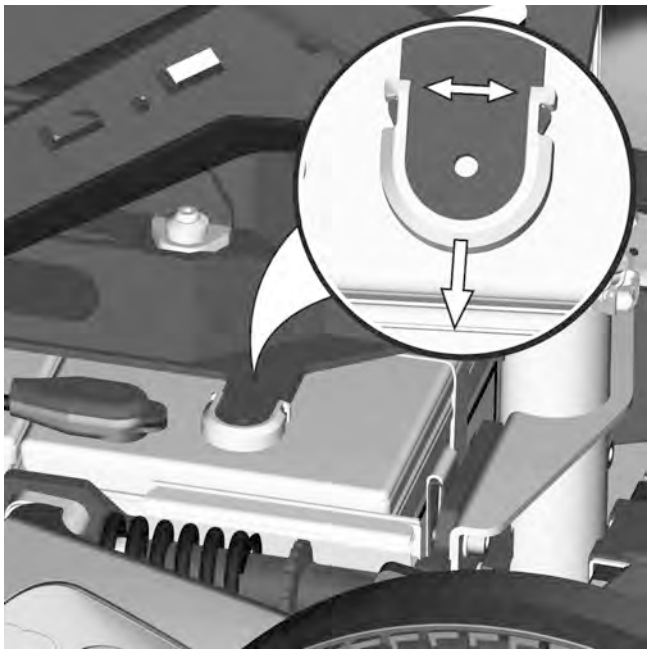

Figure 109. AP Elevator battery pole protection

AP Elevator Lift motor and belt

For this task the following tools are necessary:

- 1 Allen key 4 mm.
- 1 Allen key 5 mm.
- 1 Allen key 6 mm.
- 1 Tensiometer

Removal

1. Raise the seat to its highest position.
2. Switch off the power supply using the ON/OFF key on the control panel and switch the automatic main fuse to Off. See *Circuit breaker*, Page 93
3. Remove the chassis covers. See *Covers*, Page 13.
4. Disconnect the motor cable from the ICS-Master Module. See.fig. 110.
5. Remove the protective plate underneath the motor, it is attached with two screws. See fig. 111.

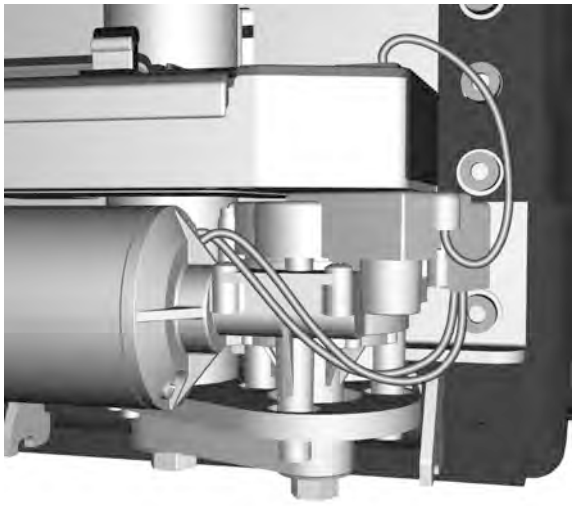

Figure 110. Disconnect the motor cable from the ICS-Master Module.

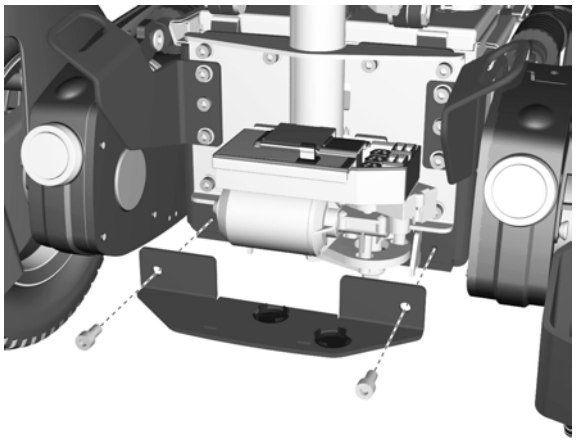

Figure 111. Remove the protective plate underneath the motor.

6. Remove the ICS Master Module. See *ICS master module*, Page 91.
7. Remove the ICS Master Module bracket. It is attached with two screws. See fig. 112.

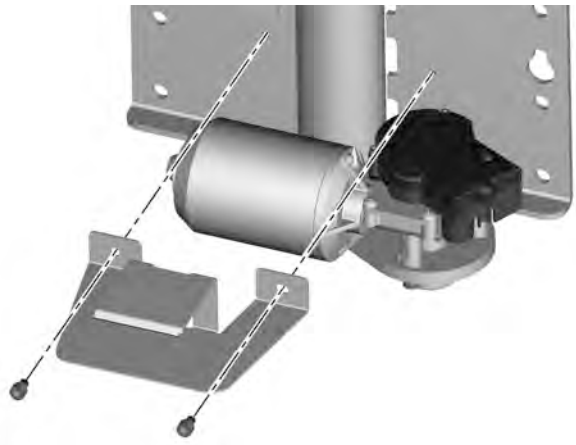

Figure 112. ICS Master Module bracket.

8. Remove the motor, it is attached with three screws. See fig. 113.

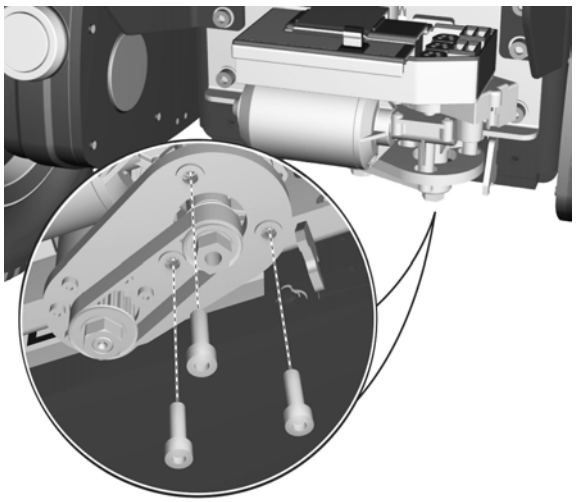

Figure 113. The motor is attached with three screws.

9. Remove the belt from the belt wheels.

Assembly

Assembly is in the reverse order

1. Assemble the belt on to the belt wheels.
2. Assemble the motor using the three screws and washers. See fig. 114.

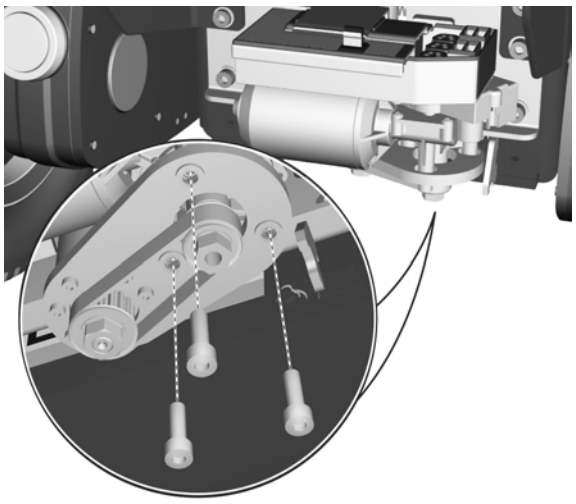

Figure 114. The motor is attached with three screws.

NOTE!
Do not tighten the screws fully, they have to be somewhat loose in order to adjust the belt tension.

3. Adjust the belt tension by pulling the motor to the side and then tightening the three screws.
4. Place the tensiometer to the belt assembly so that the wheel is touched and the side plates are on each side of the belt. See fig. 115.

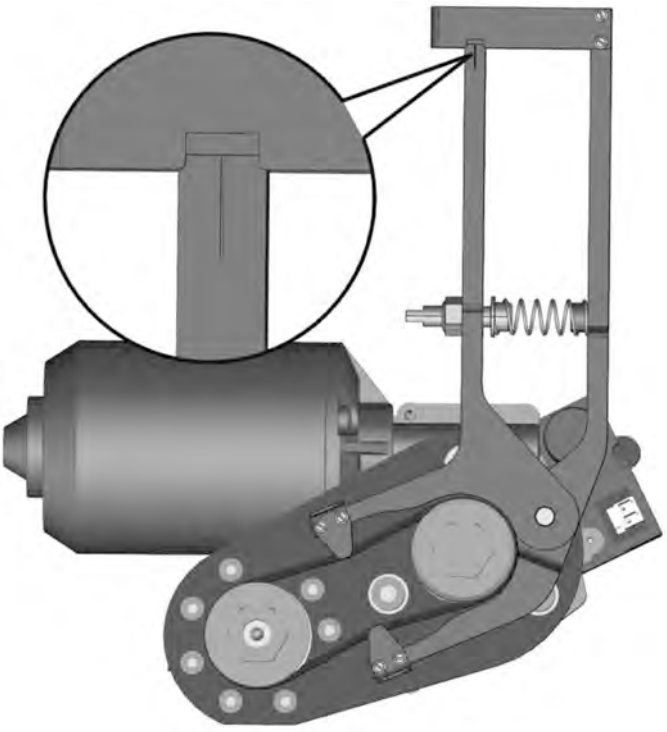

Figure 115. The pointer mark is in the allowed range between the “left” and “right” marks.

5. Let the tensiometer adjust itself by letting it go.
6. Check that the tension is correct by making sure the pointer mark is in the allowed range between the “left” and “right” marks. See fig. 115.

NOTE!
If the belt tension is incorrect it must be adjusted once again. Loosen the three screws holding the motor and start over with paragraph 3 once again.

7. Assemble the ICS Master Module bracket. It is attached with two screws. See fig. 116.

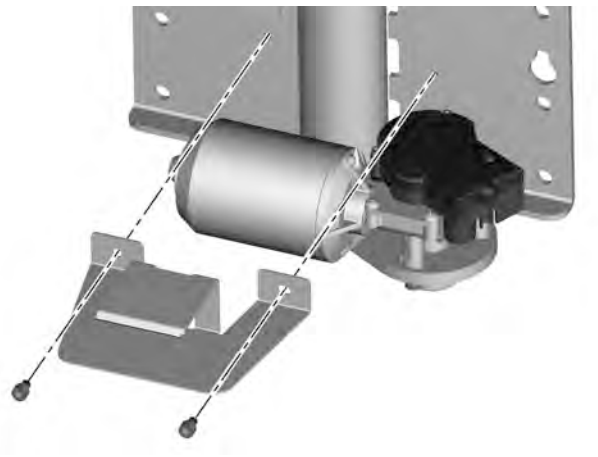

Figure 116. ICS Master Module bracket.

8. Assemble the ICS Master Module. See *ICS master module*, Page 91.

9. Connect the motor cable to the ICS-Master Module. See.fig. 117.

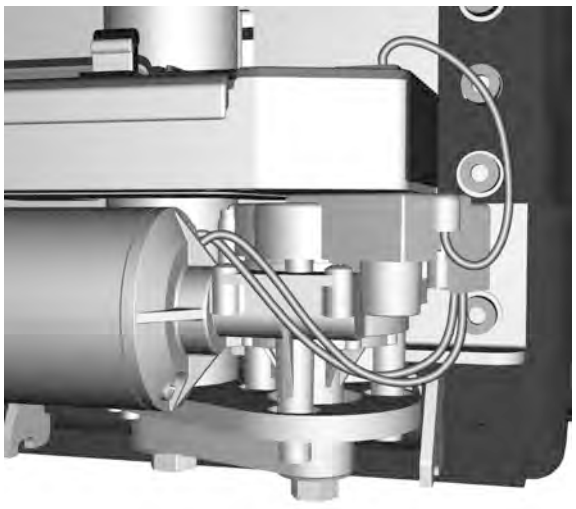

Figure 117. Connect the motor cable to the ICS-Master Module.

10. Assemble the protective plate underneath the motor, it is attached with two screws. See fig. 118.

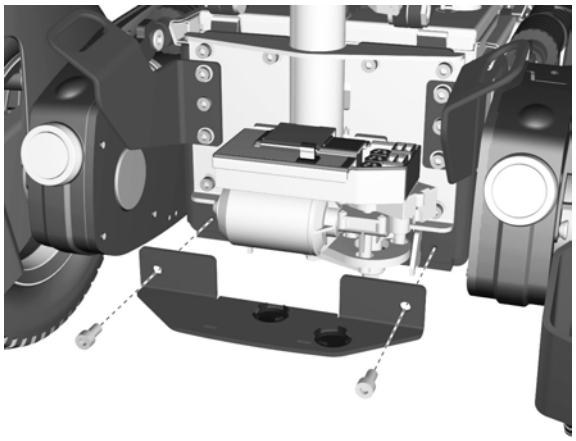

Figure 118. Assemble the protective plate underneath the motor.

AP Elevator Tilt motor

For this task the following tools are necessary:

- 1 Allen key 4 mm.
- 1 Allen key 5 mm.
- 1 Allen key 6 mm.
- 1 Spanner 10 mm.
- 1 Strap with ratchet (Approved for ≥ 200 Kg /440 lbs)

Removal

NOTE!
The actuator has to be calibrated after replacement!

1. Raise the seat to approx. 45° standing position. If the seat is not equipped with anterior tilt function or if the tilt mechanism is does not work normally because the batteries are discharged or the adjustment devices are defective, raise the seat manually. See *Manual operation of AP Elevator*, Page 53.

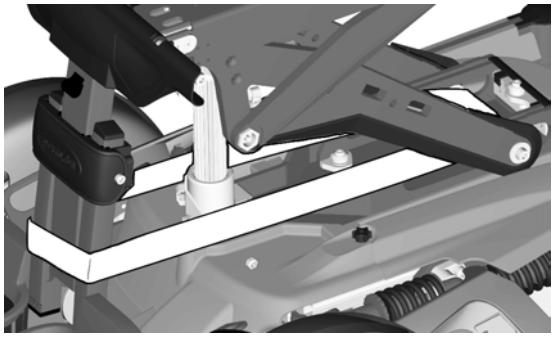

Figure 119. Secure the position of the seat by positioning a strap between the legrest and the AP Elevator axle.

2. Secure the position of the seat by positioning the strap between the legrest and the AP Elevator axle. See fig. 119.

3. Remove the four screws holding the actuator

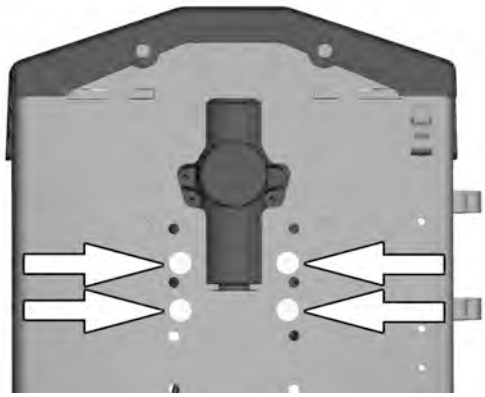

Figure 120. Remove the four screws holding the actuator stabilizer.

stabilizer. See fig.

4. Remove the screw holding the cable bracket. See fig. 121. Divide the cable by the connector of the cable.

Figure 121. Remove the circlip and axle holding the actuators rear end and the screw holding the cable bracket.

5. Remove the circlip and axle holding the actuators rear end. See fig. 121.
6. Remove the nut and the screw. See fig. 122.

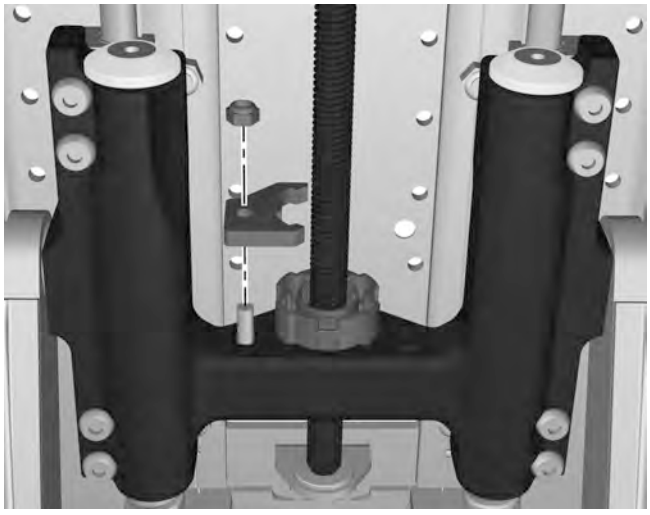

Figure 122. Remove the nut holding the nut lock.

7. Remove the eight screws holding the sleigh. See fig. 123.

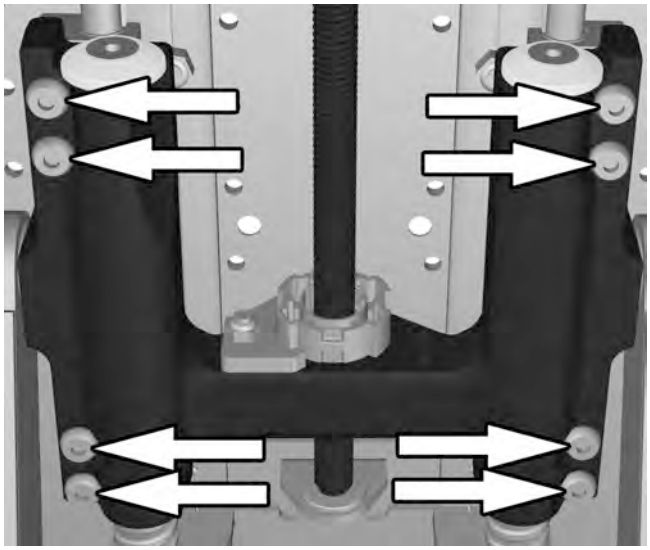

Figure 123. Remove the eight screws holding the sleigh.

8. Remove the actuator from the sleigh by unscrewing its nut. See fig. 124.

Figure 124. Remove the actuator from the sleigh by unscrewing its nut.

Assembly

1. Assemble the actuator on to the sleigh by screwing its nut fully in. See fig. 125.

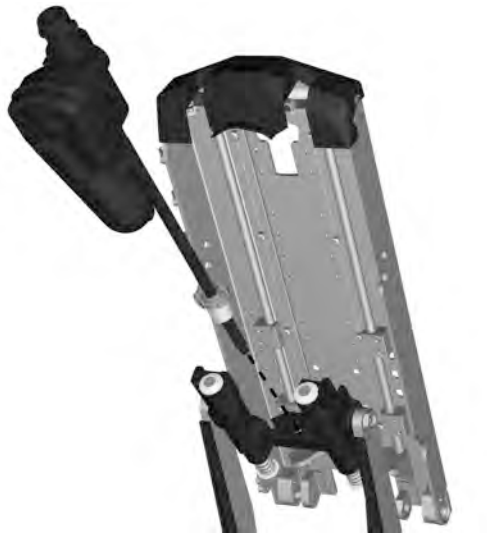

Figure 125. Assemble the actuator to the sleigh by unscrewing its nut.

2. Rotate the actuator clockwise to screw it in to the nut as much as possible.
3. Assemble the nut lock. Loosen the nut a bit to make the nut lock fit. The nut should not be completely flush with the surface. See fig. 126.

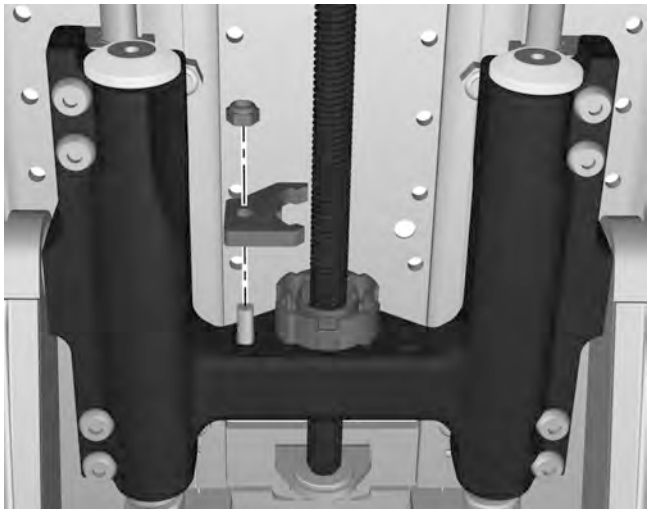

Figure 126. Assemble the nut lock.

4. Position the front end of the axle in the axle bearing and make sure the rear end of the actuator fits in its bracket. Assemble the sleigh with the eight screws. See fig. 127.

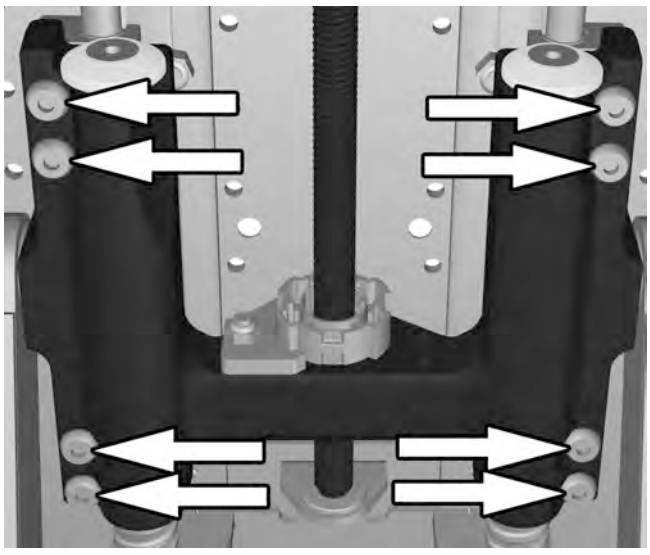

Figure 127. Assemble the sleigh with the eight screws.

5. Connect the cable to the connector on the cable. Assemble the cable bracket using the screw. See fig. 128.

Figure 128. Assemble the actuators rear end using the axle and the circlip.

6. Assemble the actuators rear end using the axle and the circlip. See fig. 128.

7. Assemble the actuator stabilizer using the four screws. See fig. 129.

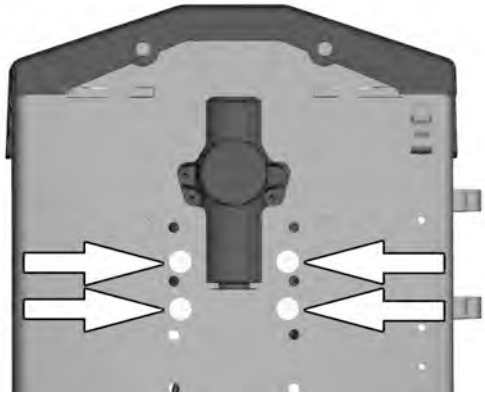

Figure 129. Assemble the actuator stabilizer using the four screws.

8. Remove the strap earlier assembled between the leg rest and the AP Elevator axle. See fig. 130.

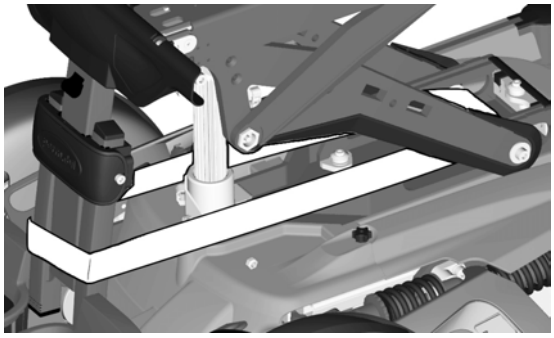

Figure 130. Remove the strap earlier assembled between the legrest and the AP Elevator axle.

AP Elevator Tilt Motor Cabling

For this task the following tools are necessary:

- 1 Allen key 3 mm.

This section describes how the Tilt Motor Cabling is mounted.

1. The first cable bracket must be mounted with the cable jacket protruding approximately 5 mm / 0.2”. See fig. 131.

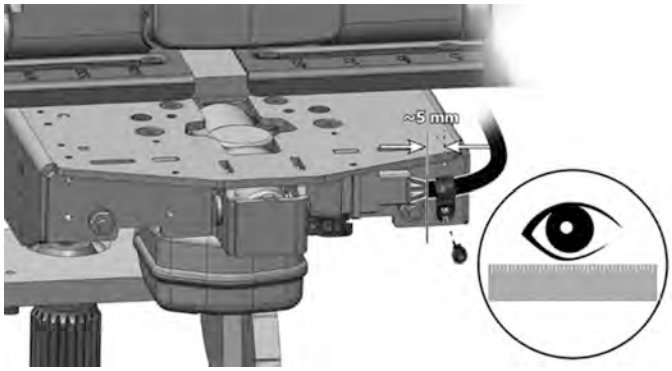

Figure 131. The cable bracket is mounted with the cable jacket protruding approximately 5 mm / 0.2”.

2. The cable two brackets on the AP-elevator are mounted with one screw each. See fig. 131 - 132. Use a Torque wrench to tighten the screws. **Tightening torque 1.2 Nm / 0.9 Ft/lbs**.

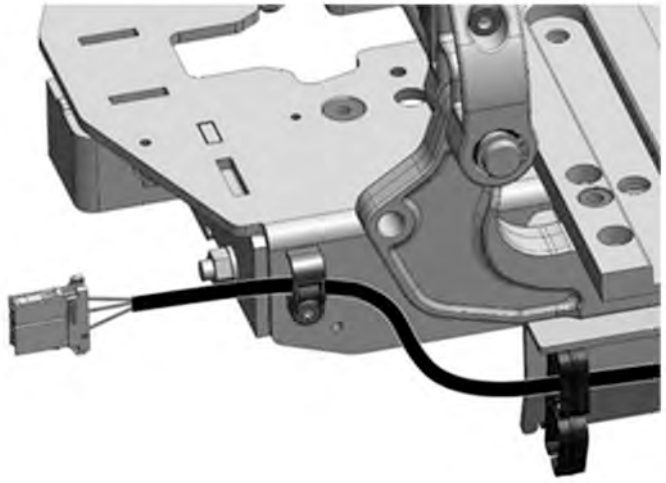

Figure 132. Cable bracket mounted on the AP Elevator Tilt Motor.

3. Based on the seat depth, the cable either requires five or four cable brackets on the right hand side of the seat. If the seat depth is set between 370 – 520 mm (15” - 21”), the cable is mounted in five cable brackets. See fig. 133.

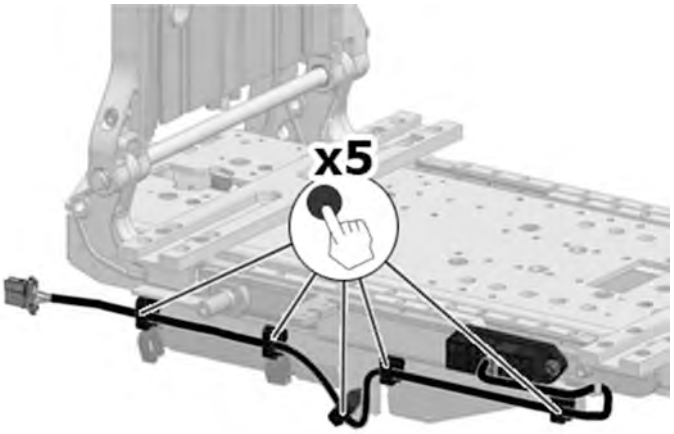

Figure 133. Tilt Motor Cable mounted with five cable brackets (Seat depth 370–520 mm (15”-21”)).

4. If the seat depth is set between 545 – 570 mm (22” - 23”), the cable is mounted in four cable brackets. See fig. 134.

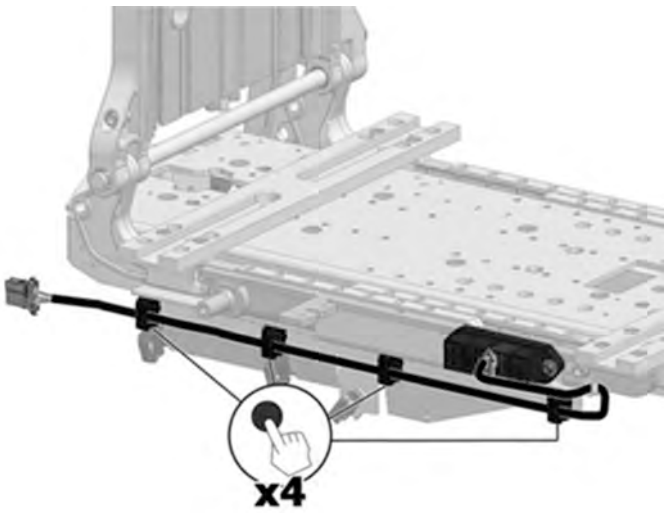

Figure 134. Tilt Motor Cable mounted with four cable brackets (Seat depth 545–570 mm (22”-23”)).

5. The Tilt Motor Cable is connected to the fifth position of the connector block at the right hand side of the seat. See fig. 135.

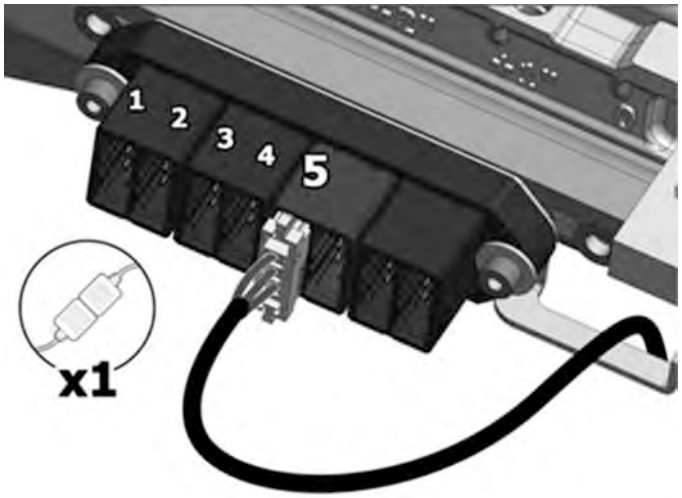

Figure 135. The Tilt Motor Cable is connected to the fifth position of the connector block.

AP Elevator Spring unit

For this task the following tools are necessary:

- 1 Allen key 5 mm.

Removal

1. Raise the seat a bit to get access to the spring unit, stop just before the AP elevator axle touches the spring unit.
2. Switch off the power supply using the ON/OFF key on the control panel.
3. Remove the spring unit, it is attached with three screws and washers. See fig. 136.

Assembly

1. Assemble the spring unit, it is attached with three screws and washers. See fig. 136.

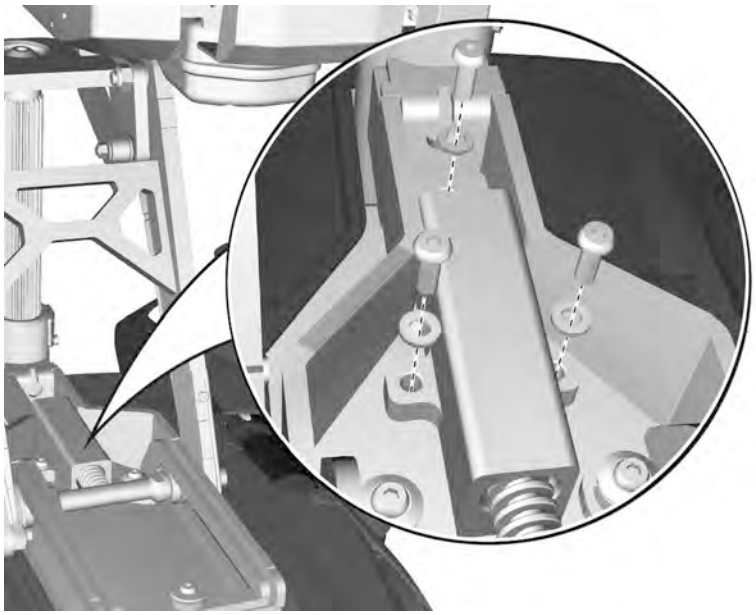

Figure 136. Assembling the spring unit, it is attached with three screws and washers.

AP Elevator Track Wheel kit

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key socket 6 mm.

⚠ WARNING!

Two people are required for this task due to heavy lifting. Watch out for moving parts, there is a risk of crushing.

Removal

1. Raise the seat a bit, stop just before the AP elevator axle touches the spring unit.
2. Run the leg rest slightly outwards, approximately 30°.
3. Switch off the main power switch on the control panel.
4. Hold the rear end of the seat in a steady grip. Remove the screw (1) and washers (2 and 3) on both sides.
5. When the screws are removed, the rear end of the seat will come loose. Tilt the seat slightly forward in order to reveal the axle and all the parts.
6. Remove the roller (4), the slide bearing (5), the shaft (6), the slide bearing (7) and the inner roller (8) from each side.
7. Remove the shaft (9).

Assembly

1. Position the shaft (9).
2. Assemble the inner roller (8), slide bearing (7), the shaft (6), the slide bearing (5), the roller (4), the washers (3) and (2) and the screw (1) on to the shaft (9).
3. Tighten the screws (1) using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs.**

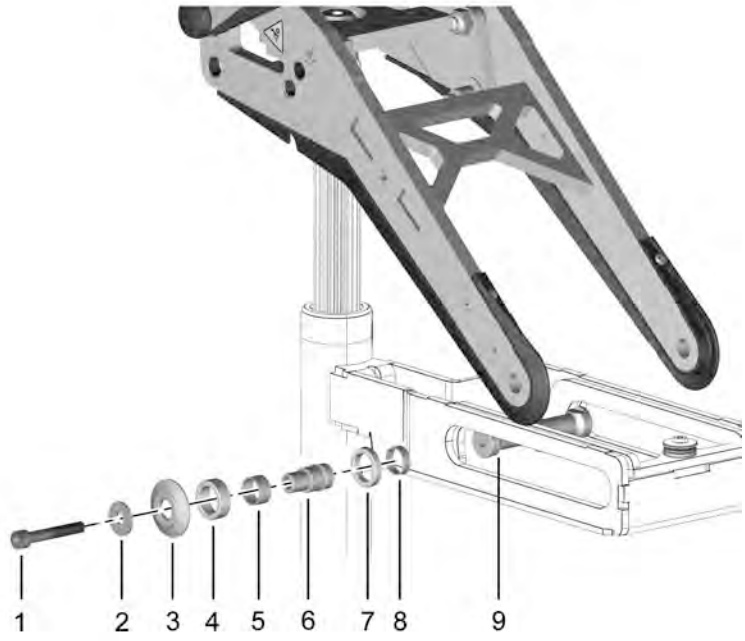

Figure 137. The track wheel kit.

Rnet and ICS bus cable mounting

This section describes how the Rnet and ICS bus cables are mounted between the chassis and the seat.

1. The Rnet bus cable is connected to the connector block and mounted in two cable brackets at the back of the back rest. See fig. 138.

Figure 138. The Rnet bus cable is connected to the connector block and mounted in two cable brackets at the back of the back rest.

2. The cable is mounted in the four cable brackets on the right hand side of the seat. See fig. 139.

Figure 139. The cable is mounted in the four cable brackets on the right hand side of the seat.

3. The ICS bus cable is connected to the seventh position of the connector block on the right hand side of the seat. See fig. 140.

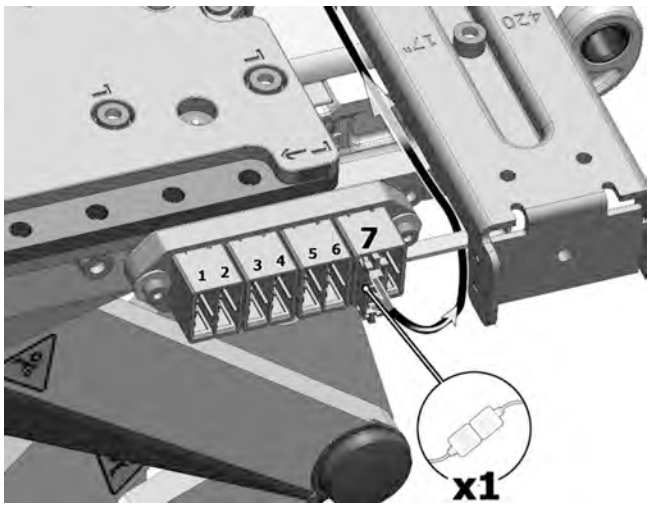

Figure 140. The ICS bus cable is connected to the seventh position of the connector block.

4. The cables are laid across the seat frame and mounted in the two cable brackets. See fig. 141. Avoid crossing the cables with each other between the connector block and the first cable bracket on top of the seat. Use a Torque wrench to tighten the screws. **Tightening torque 1.2 Nm / 0.9 Ft/lbs**.

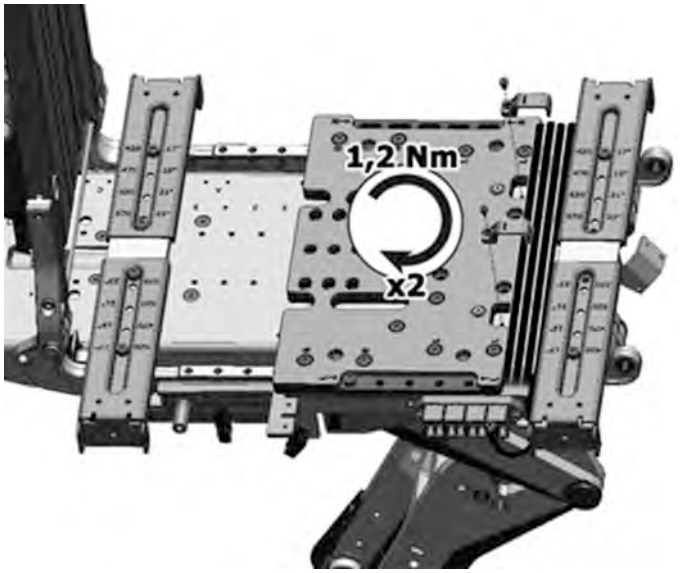

Figure 141. The bus cables are laid across the seat frame and mounted in the two cable brackets.

5. The length of the cable loop between the first cable bracket on the AP–Elevator and the seat frame must be 170 mm. (7”). The ICS bus cable is mounted behind the Rnet bus cable in the cable brackets. See fig. 142. **NOTE!** On seats with VS leg rest, Power transfer leg rest or Power adjustable leg length, the actuators cable must always be positioned in front of the bus cables loop. This to avoid damages to the cables during leg rest movement.

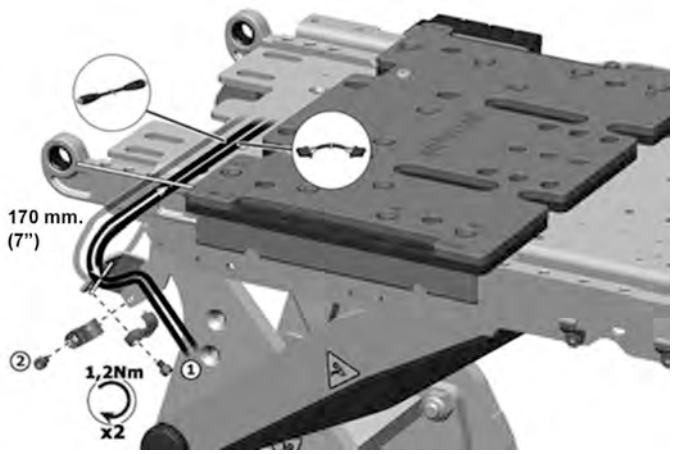

Figure 142. The distance between the first cable bracket on the AP–Elevator and the seat frame must be 170 mm. (7”).

6. The bus cables are mounted in the two cable brackets on the upper AP elevators arm. The cable

brackets are mounted with one screw each. See fig. 142. Use a Torque wrench to tighten the screws. **Tightening torque 1.2 Nm / 0.9 Ft/lbs**.

7. The length of the cable loop between the cable brackets on the upper- and lower AP elevator arm must be 170 mm. (7”). See fig. 143.

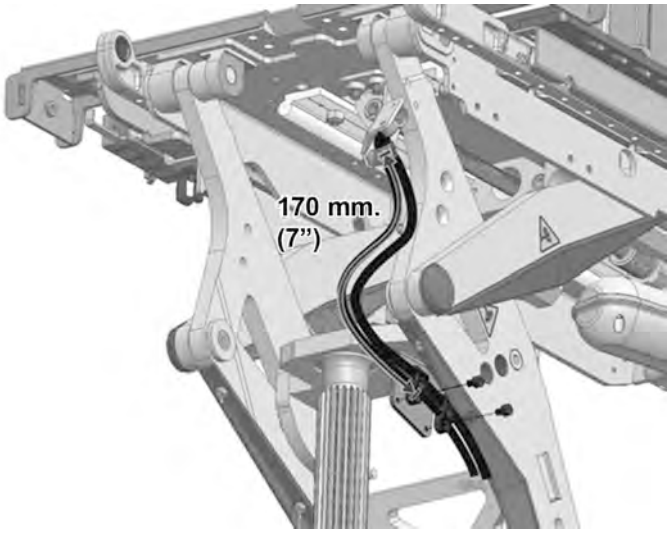

Figure 143. The length of the cable loop between the cable brackets on the upper- and lower part of the AP elevator must be 170 mm. (7”).

8. The bus cable is mounted in the two cable brackets on the lower AP elevators arm. The cable brackets are mounted with one screw each. See fig. 144. Use a Torque wrench to tighten the screws. **Tightening torque 1.2 Nm / 0.9 Ft/lbs**.

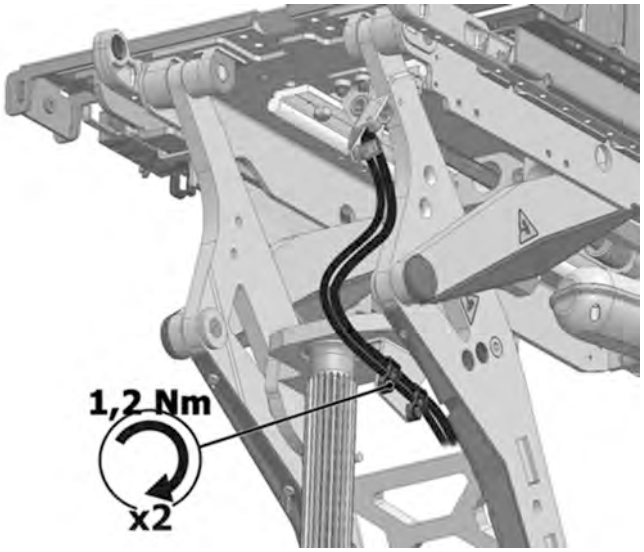

Figure 144. The bus cable is mounted in the two cable brackets on the lower part of the AP elevators arm.

9. The bus cables are tied together with a cable tie in the middle of the cable loop. See fig. 145.

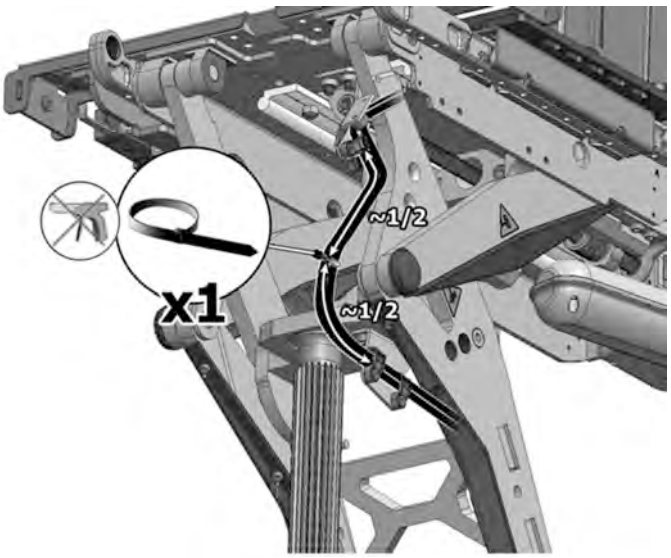

Figure 145. The Rnet- and ICS bus cables are tied together with a cable tie in the middle of the cable loop.

10. The length of the cable loop between the lowest cable bracket on the lower AP elevator arm and the cable brackets on the pillar must be 270 mm. (11”). See fig. 146.

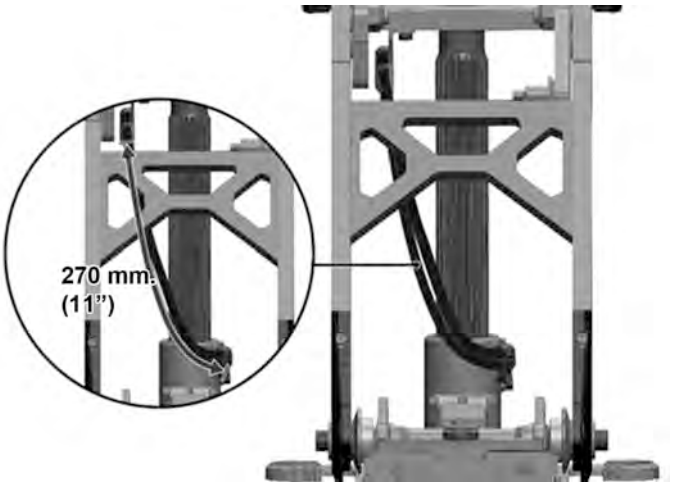

Figure 146. The length of the cable loop between the cable brackets on the lower part of the AP elevator and the pillar must be 270 mm. (11”).

11. The bus cables are mounted on the pillar with three cable brackets. The ICS bus cable is mounted above the Rnet bus cable in the cable brackets. See fig. 147.

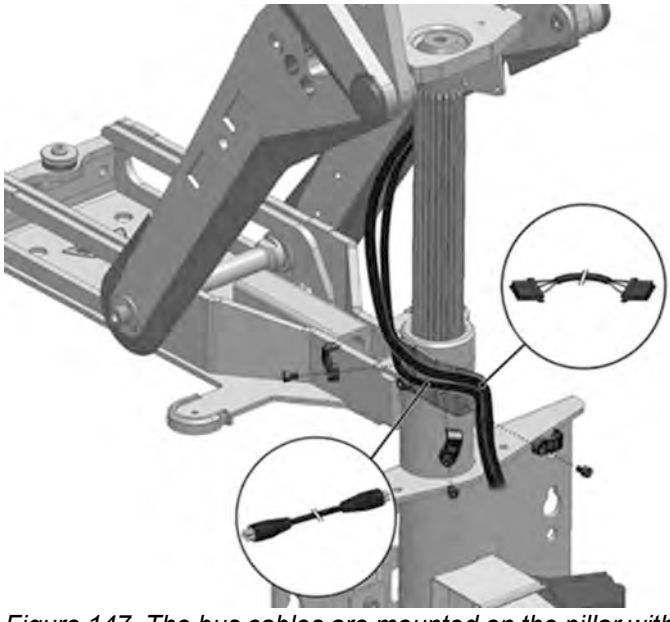

Figure 147. The bus cables are mounted on the pillar with three cable brackets.

12. The cable brackets are mounted with one screw each. See fig. 148. Use a Torque wrench to tighten the screws. **Tightening torque 1.2 Nm / 0.9 Ft/lbs**.

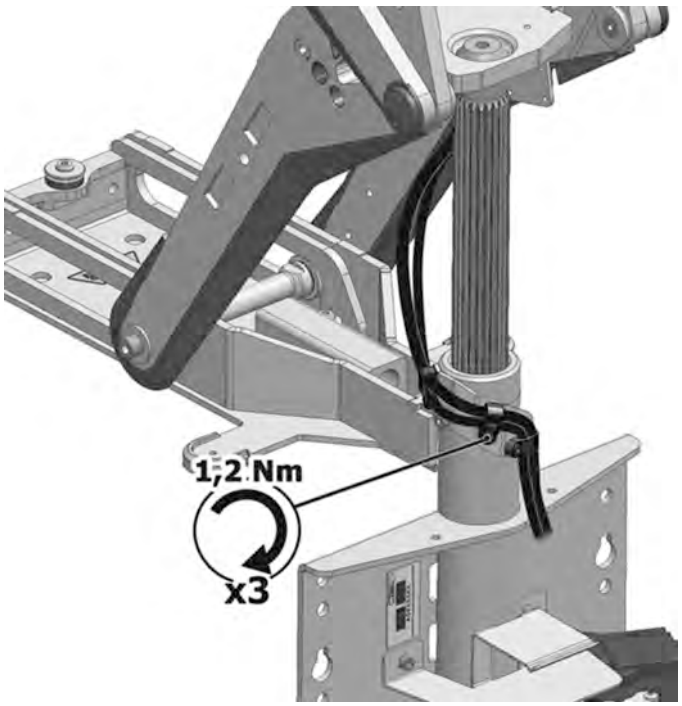

Figure 148. The cable is mounted with three cable brackets on the pillar, each mounted with a screw.

13. The bus cables are tied together with two cable ties, at regular distances on the cable loop. See fig. 149.

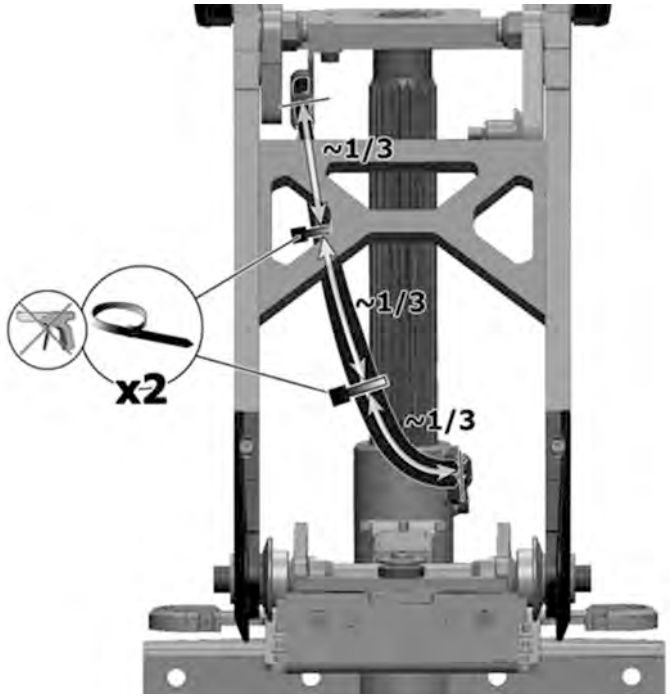

Figure 149. The bus cables are tied together with two cable ties, at regular distances on the cable loop.

14. The bus cables are connected to the ICS Master Module. See fig. 150.

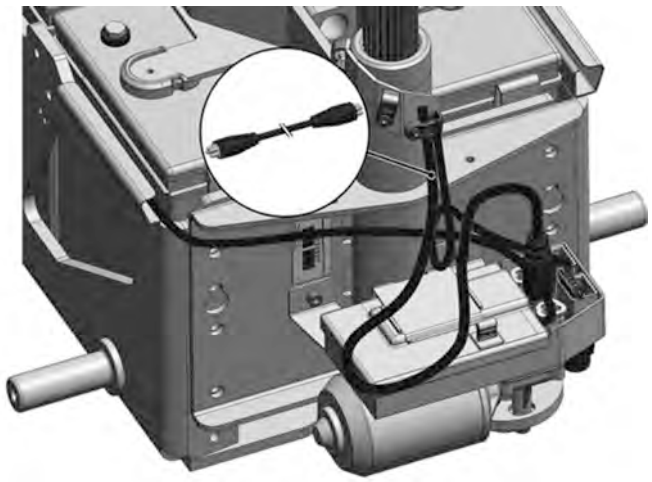

Figure 150. The bus cable is connected to the ICS Master Module.

15. The rest of the cables are tied into a loop with a cable tie. See fig. 151.

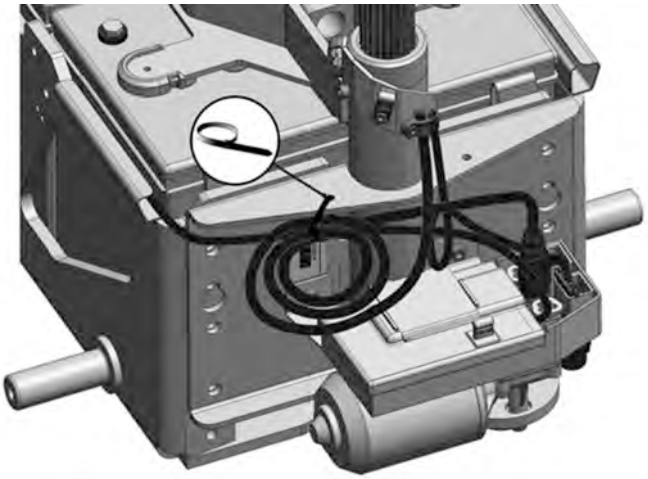

Figure 151. The rest of the cable is tied with a cable tie.

NOTE!
It important that the cables goes straight down from the last cable bracket on the pillar to avoid pinching when mounting of the chassis front cover.

Battery cable holder

For this task the following tools are necessary:

- 1 Spanner 8 mm.

Removal

1. Raise the seat to its highest position.
2. Switch off the main power switch on the control panel.
3. Remove the chassis covers. See *Removal of the chassis covers*, Page 13.
4. Remove the nut holding the cable holder. See fig. 152.
5. Remove the cable holder.

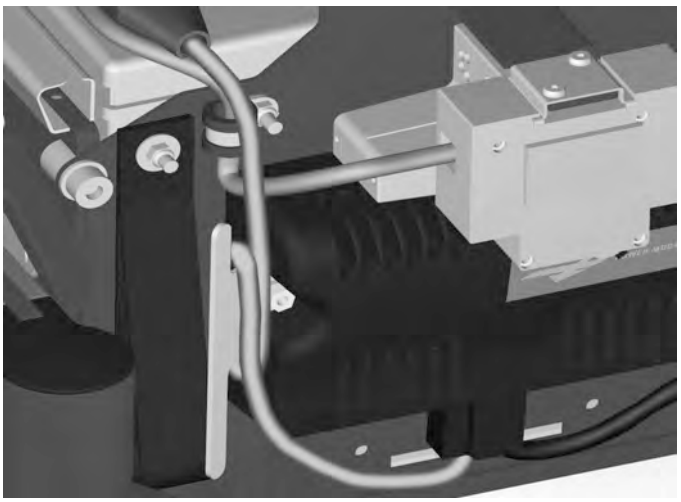

Figure 152. The cable holder is attached with a nut.

Assembly

1. Position the cable holder on the left attachment screw of the Power Module. See fig. 152.
2. Wrap the cable connected to the left battery pole of the rear battery one turn around the cable holder. See fig. 152.

Power Module R-net

For this task the following tools are necessary:

- 1 Spanner 8 mm.

Removal

1. Raise the seat to the highest position. If the seat lift does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised/lowered manually, see *Manual operation of AP Elevator*, Page 53.
2. Switch off the main power switch on the control panel.
3. Put the circuit breaker in the "OFF" position. It is accessed through a hole in the chassis cover. See *Circuit breaker*, Page 93.
4. Remove the chassis covers, see *Covers*, Page 13.
5. Disconnect the electrical connections to the R-net controller, being attentive to their placement: see fig. 154.
6. Remove the Power Module, it is fitted with two nuts. See fig. 153.

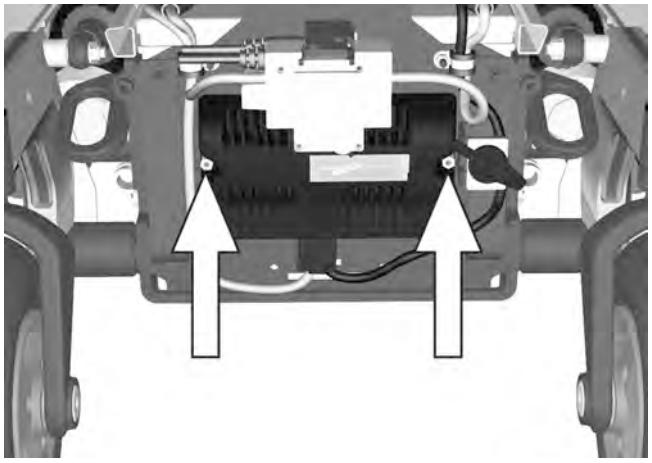

Figure 153. The Power Module is fitted with two nuts.

Assembly

Assemble in reverse order.

1. Reassemble the Power Module, it is fitted with two nuts. See fig. 153.
2. Reconnect the electrical connections to the R-net controller. See fig. 154.
3. Reassemble the chassis covers, see *Covers*, Page 13.
4. Put the circuit breaker in the "ON" position. It is accessed through a hole in the chassis cover. See *Circuit breaker*, Page 93.

BUS	BUS
M1	Motor 1, Left
BATT	Battery
M2	Motor 2, Right
INH	Inhibit
OBC	External charging socket

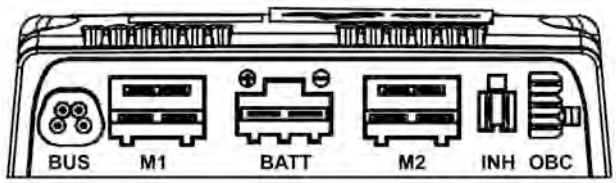

Figure 154. Power Module cable connections (Rnet PM120).

Control panel R-net

For this task the following tools are necessary:

- 1 Allen key 5 mm.

Removal

1. Switch off the main power switch on the control panel.
2. Remove the cable ties holding the control panel cabling in place under the arm rest. Note the positions of the cable ties for subsequent assembling.
3. Divide the control panel cabling at the contact on the cabling.
4. Remove the control panel (1). It is held in place with two screws. These two screws also hold the bracket for the ICS control panel (2), if there is one fitted. See fig. 155.

Assembly

Assemble in the reverse order.

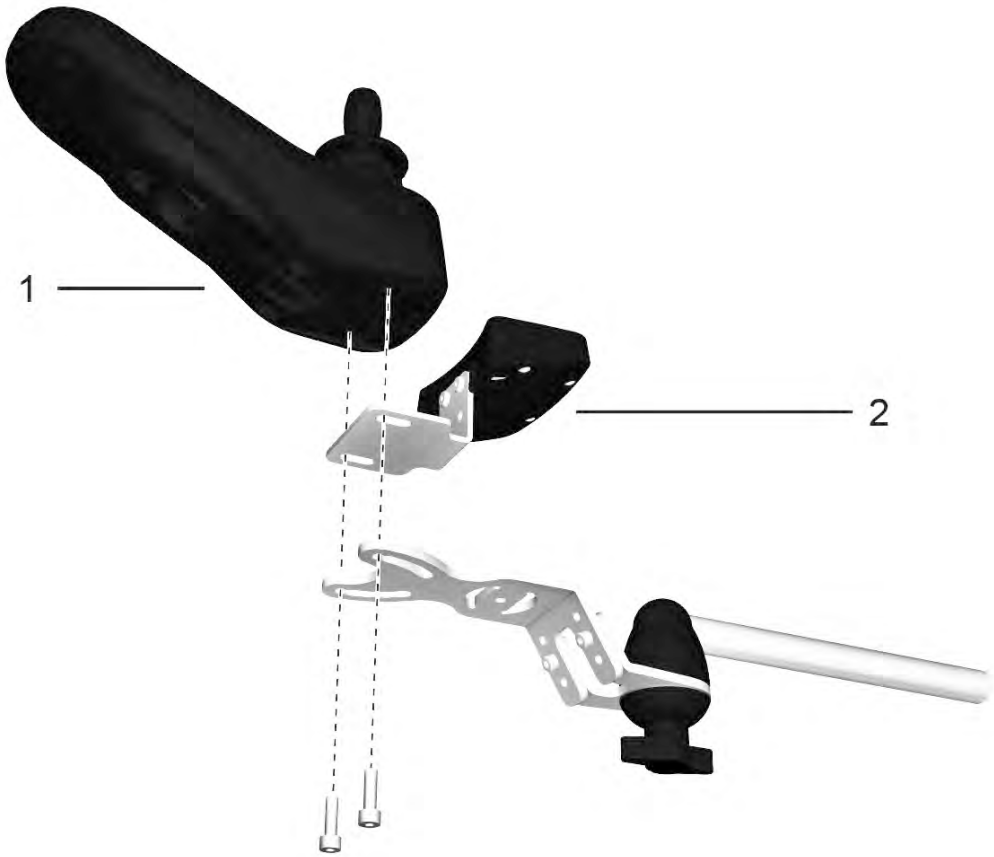

Figure 155. The control panel is held in place with two screws.

ICS master module

Removal

1. Raise the seat to the highest position. If the seat lift does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised/lowered manually, see *Manual operation of AP Elevator*, Page 53.
2. Switch off the main power switch on the control panel.
3. Put the circuit breaker in the "OFF" position. It is accessed through a hole in the chassis cover. See *Circuit breaker*, Page 93..
4. Remove the front chassis cover. See *Covers*, Page 13.
5. Disconnect the electrical connections of the ICS Master Module, being attentive to their placement. See fig. 157.
6. Pull the master module straight out of its holder.
7. If the wheelchair is equipped with lights, remove the lid from the ICS Master Module and disconnect the lights cabling from the contacts on the circuit board. See fig. 157.

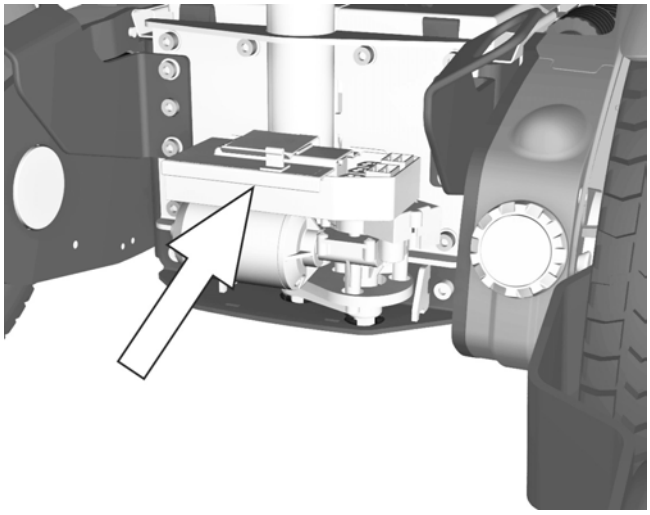

Figure 156. ICS master module.

Assembly

Fit the ICS Master Module in the reverse order.

⚠ CAUTION!

The ICS Master Module must be configured for the seat before being fitted. Detailed information on configuration is provided in the Technical manual for the ICS control system.

1. If the wheelchair is equipped with lights, reconnect the lights cabling to the contacts on the circuit board and then fit the lid on the ICS Master Module.
2. Push the ICS Master Module straight in to its holder.
3. Reconnect the electrical connections of the ICS Master Module, being attentive to their placement. See fig. 157. See also the sticker on the lid.
4. Refit the chassis covers. See *Covers*, Page 13.
5. Put the circuit breaker in the "OFF" position. It is accessed through a hole in the chassis cover. See fig. *Circuit breaker*, Page 93.
6. Switch off the main power switch on the control panel.
7. Raise the seat to the highest position. If the seat lift does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised/lowered manually, see *Manual operation of AP Elevator*, Page 53.

Rnet 1	Rnet connector 1
Rnet 2	Rnet connector 2
Rnet 3	Rnet connector 3
J4	Left Light/Turn signal
J5	Right Light/Turn signal
J6	Serial channel (PC)
J7	Left and right Light/Turn signal
J8	Inhibit input
J11	ICS Connector 1 & 2
J12	ICS Connector 3 & 4
F1	Fuse (seat functions)

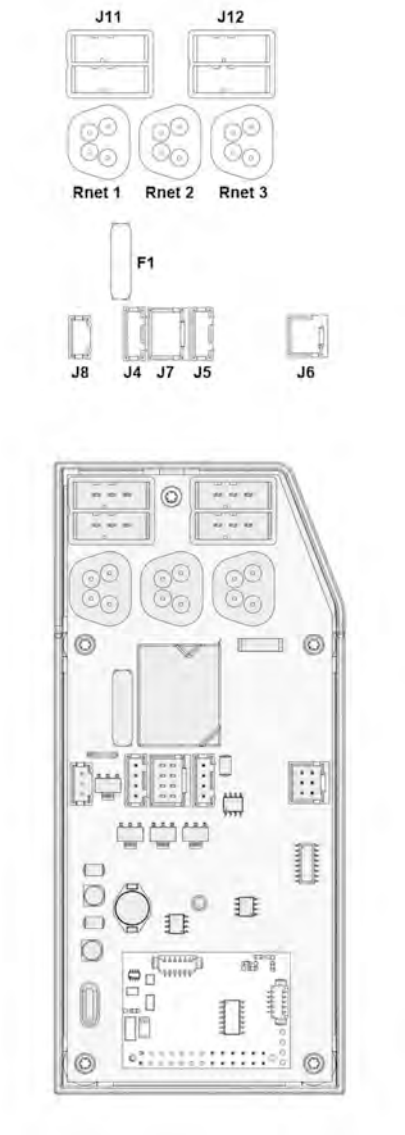

Figure 157. ICS Master Module.

Circuit breaker

Resetting

The circuit breaker also serves as a battery isolator but is normally referred to as a circuit breaker.

Circuit breaker replacement is normally not required; it is of the automatic type that can be reset when tripped.

⚠ CAUTION!

A tripped circuit breaker often entails a major electrical fault. The cause should be carefully investigated before resetting.

Figure 158. Circuit breaker/Battery isolator.

Replacing

For this task the following tools are necessary:

- 1 Phillips screwdriver

1. Raise the seat to the highest position. If the seat lift does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised/lowered manually, see *Manual operation of AP Elevator*, Page 53.

2. Put the circuit breaker in the "OFF" position. It is accessed through a hole in the chassis cover. See fig. 158.

3. Remove the chassis rear cover. See *Covers*, Page 13.

4. Disconnect the minus cable from the rear battery.

5. Disconnect the plus cable from the front battery.

⚠ CAUTION!

Bend the battery connection cables off to the side to prevent them from coming in contact with the battery terminals.

6. Release the main fuse by pulling the small handle on the right hand side of the main fuse. See fig. 159.

⚠ CAUTION!

Note the orientation of the circuit breaker with consideration to subsequent assembling. The ON/OFF positions must agree with the decal.

7. Disconnect the cables from the circuit breaker by undoing the screws. See fig. 160.

8. Put the new circuit breaker in the "OFF" position.

9. Connect the cables to the new circuit breaker and tighten the two screws.

⚠ CAUTION!

Check that the cables are firmly attached.

Pulling the small handle on the right hand side of the new main fuse and position it on the chassis. Fix it in correct position by releasing the small handle. See fig.159.

⚠ CAUTION!

Note the orientation of the circuit breaker with consideration to subsequent assembling. The ON/OFF positions must agree with the decal.

10. Reconnect the battery connection cables to the batteries.

11. Refit the chassis covers. See *Covers*, Page 13.

Put the circuit breaker in the "ON" position; see fig. 158.

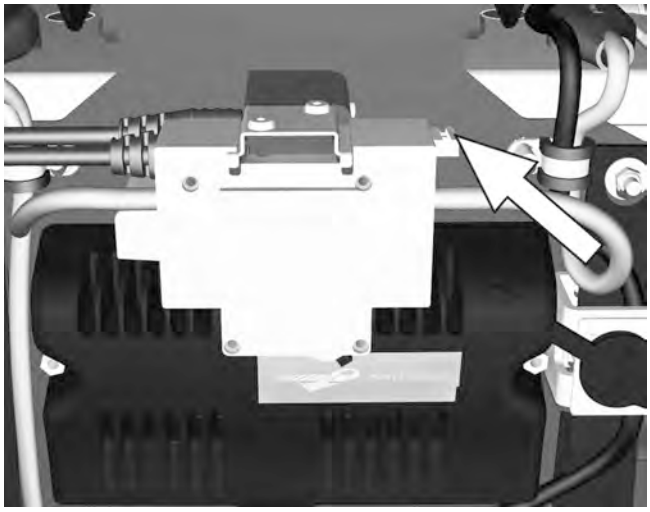

Figure 159. Circuit breaker bracket.

Figure 160. Circuit breaker cable connection.

Lights and indicators

Main cable

Removal

1. Raise the seat to its highest position.
2. Switch off the power supply using the ON/OFF key on the control panel and switch the automatic main fuse to Off. See *Circuit breaker*, Page 93.
3. Remove the chassis covers. See *Covers*, Page 13.
4. Remove the drive package covers including the front fender. See *Removal of the drive package covers including the front fender*, Page 18
5. Disconnect the connectors J4, J5 och J7 from the ICS Master Module. See fig.162.

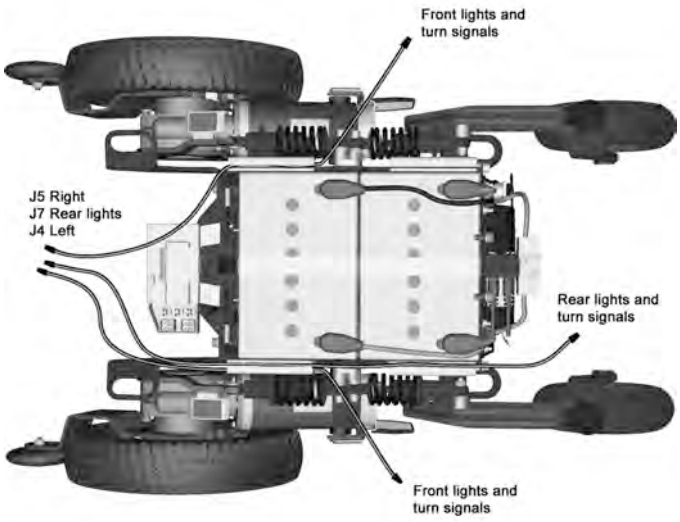

Figure 161. Lights cabling.

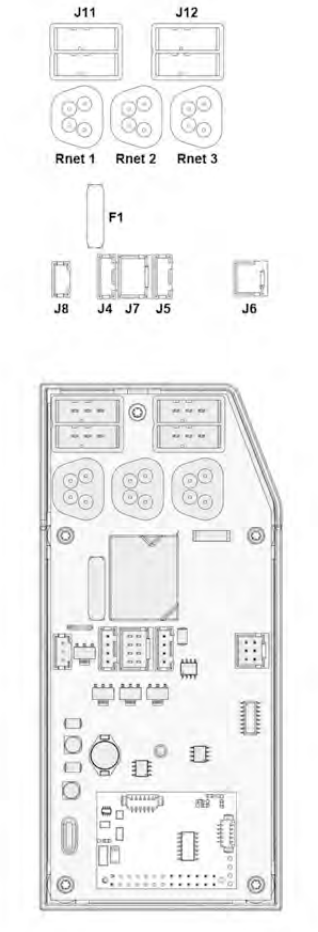

Figure 162. ICS Master Module.

6. Remove the cable from its cable brackets on the left and right hand side of the chassis. See fig. 163.

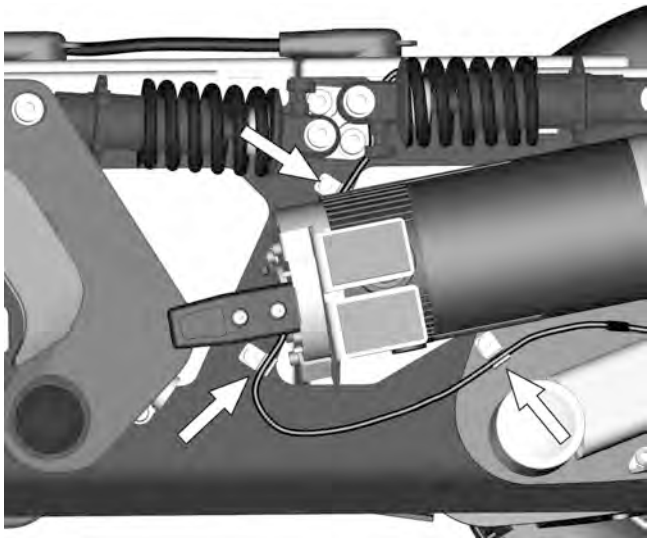

Figure 163. The cable is assembled with three cable brackets on the left and right hand side of the chassis.

7. Remove the lights cabling from the cable tunnels on the left and right hand side of the chassis. See fig. 161.

Assembly

1. Raise the seat to its highest position.
2. Switch off the power supply using the ON/OFF key on the control panel and switch the automatic main fuse to Off. See *Circuit breaker*, Page 93.
3. Remove the chassis covers. See *Covers*, Page 13.
4. Remove the drive package covers including the front fender. See *Removal of the drive package covers including the front fender*, Page 18
5. Position the lights cabling on the chassis and assemble the cables in the cable tunnels on the left and right hand side of the chassis. See fig. 164.
6. Connect the connectors J4, J5 och J7 to the ICS Master Module. See fig.165.

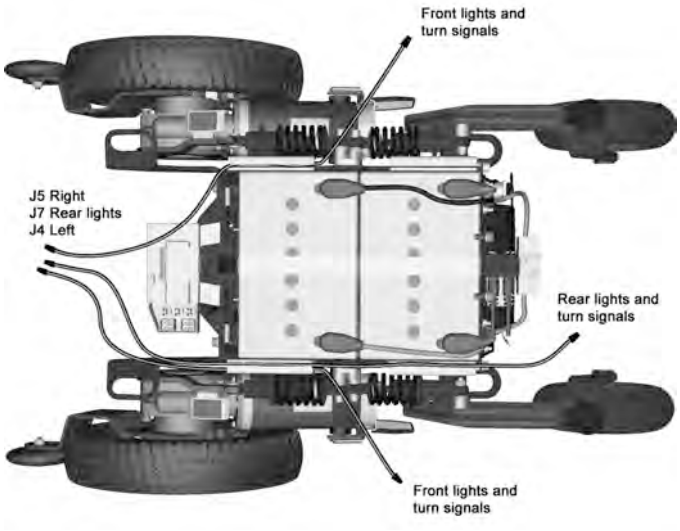

Figure 164. Lights cabling.

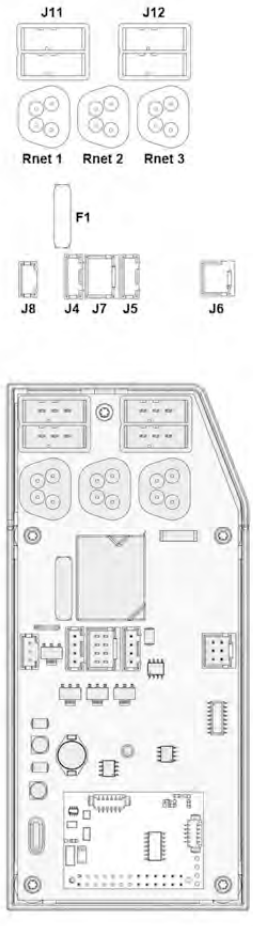

Figure 165. ICS Master Module.

7. Assembly the cable to its cable brackets on the left and right hand side of the chassis. See fig. 166.

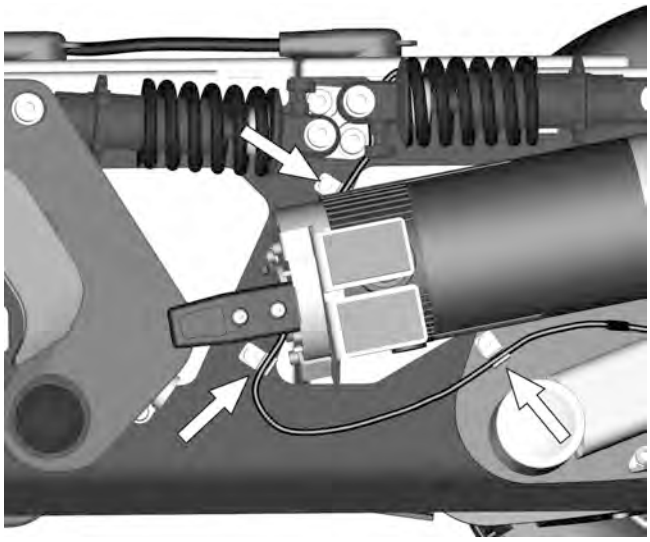

Figure 166. The cable is assembled with three cable brackets on the left and right hand side of the chassis.

Front indicator

Removal

1. Switch off the power supply using the ON/OFF key on the control panel and switch the automatic main fuse to Off. See *Circuit breaker*, Page 93
2. Remove the drive package covers including the front fender. See *Removal of the drive package covers including the front fender*, Page 18. Disconnect the lights and indicators at the connectors on the cables.
3. Disconnect the two cables on the back of the indicator by pulling them straight out.
4. The indicators are assembled on the cover with double sided tape. Carefully peel the indicator in question off, if needed use a suitable tool to facilitate removal. Be careful not damaging the paint work on the cover.
5. To remove the cables, remove the tape that holds the cables to the cover. See fig. 167.

Figure 167. The front indicator is assembled on the drive package cover.

Assembly

1. Remove the protective tape on the back of the indicator.
2. Rotate the indicator until the text ”TOP” is pointing straight upwards and position the indicator on the drive package cover. Press it against the cover until the double sided tape sticks on to the cover. See fig. 168.
3. Connect the two cables on the back of the indicator.
4. If removed, fit the cables with a tape on the inside of the cover. See fig. 167.
5. Assemble the covers and connect the indicator cables to the front light and to the lights main cable in the chassis. See *Assembly of the drive package covers including front fender*, Page 20.

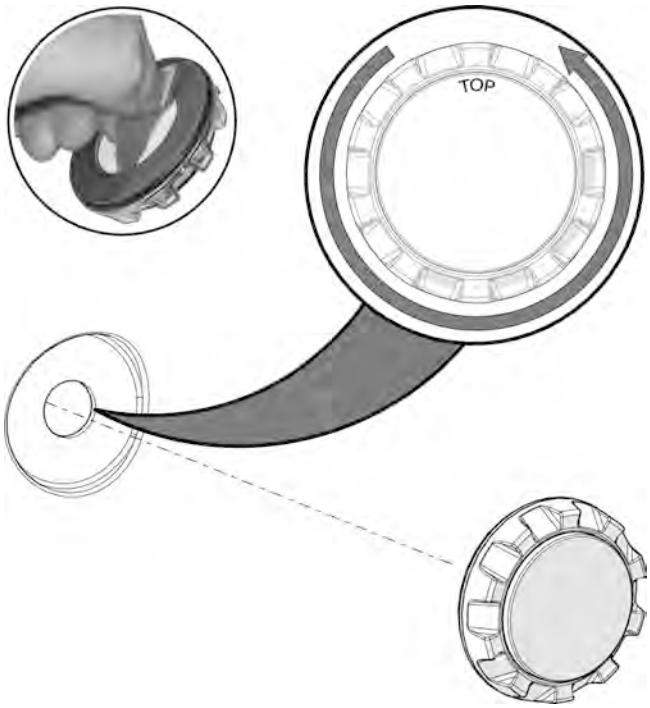

Figure 168. Remove the protective tape and rotate the indicator until the text ”TOP” is pointing straight upwards.

Front lights

For this task the following tools are necessary:

- 1 Allen key 2,5 mm.

Removal

1. Switch off the power supply using the ON/OFF key on the control panel and switch the automatic main fuse to Off. See *Circuit breaker*, Page 93
2. Remove the front fender. See *Removal of the drive package covers including the front fender*, Page 18.
3. Pull the cable out of the slots and fasten it with a cable tie, then position the end of the lights cable up the hole through the fender. See fig. 169.
4. Remove the front light. It is attached with two screws from underneath. See fig. 170.

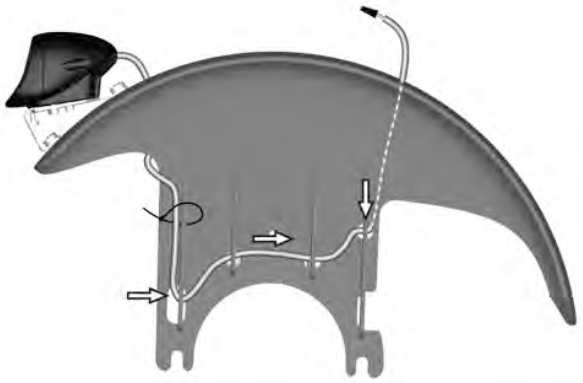

Figure 169. Pull the cable out of the slots and fasten it with a cable tie, then position the end of the lights cable up the hole through the fender.

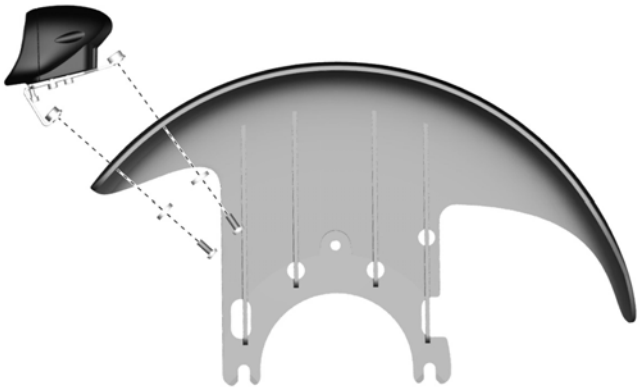

Figure 170. The front light. It is attached with two screws from underneath.

Assembly

1. Assemble the front light using the two screws from underneath. See fig. 170.
2. Assemble the cable on the inside of the front fender running it through the slots and using a cable tie, then position the end of the lights cable up the hole through the fender. See fig.171
3. Assemble the front fender. See *Assembly of the drive package covers including front fender*, Page 20.

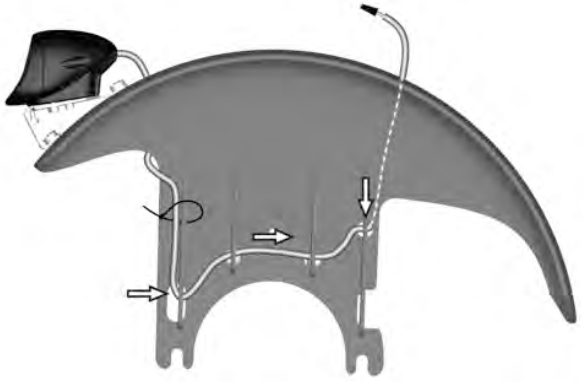

Figure 171. Assemble the cable on the inside of the front fender running it through the slots and using a cable tie.

Adjustment

1. Loosen the three attachment screws. See fig. 172.
2. Adjust the angle of the light by turning the adjustment screw clock- or counter clockwise. See fig. 172.
3. Fix into desired angle by tightening the three attachment screws. See fig. 172.

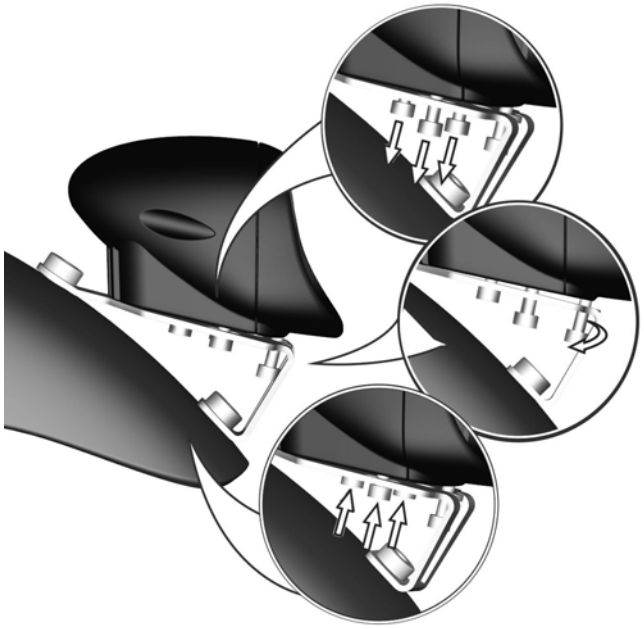

Figure 172. Adjustment of the front lights.

Rear lights and indicators

Removal

1. Remove the chassis covers. See 173.
2. Disconnect the cables on the back of the light/indicator by pulling them straight out.
3. The lights/indicators are assembled on the cover with double sided tape. Carefully peel the indicator in question off, if needed use a suitable tool to facilitate removal. Be careful not damaging the paint work on the cover.

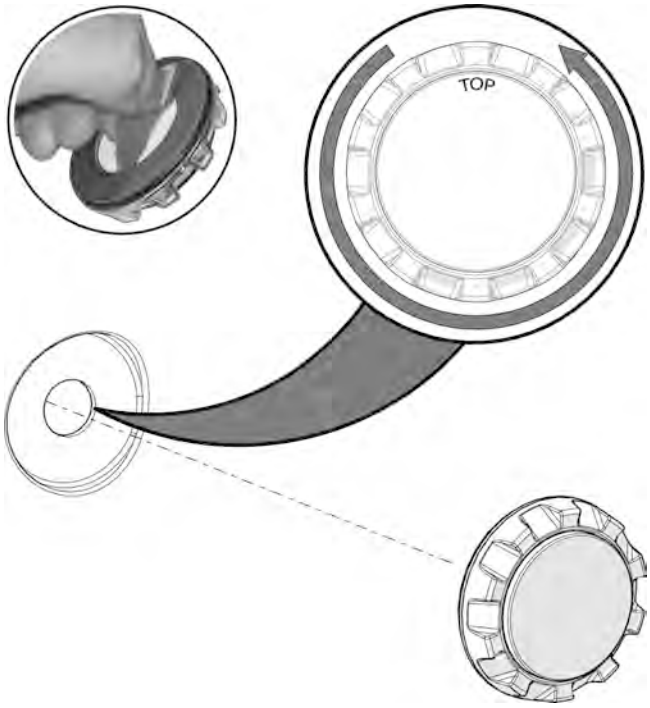

Figure 173. Remove the protective tape and rotate the light/indicator until the text ”TOP” is pointing straight upwards.

Assembly

1. Remove the protective tape on the back of the light/indicator.
2. Rotate the light/indicator until the text ”TOP” is pointing straight upwards and position the indicator on the drive package cover. Press it against the cover until the double sided tape sticks on to the cover. See fig. 168.
3. Connect the cables on the back of the light/indicator. See fig. 174.
4. Assemble the covers and connect the lights/indicators cable to the lights main cable in the chassis. See *Assembly of the chassis covers*, Page 15.

Figure 174.

Seat

Removal

For this task the following tools are necessary:

- 1 Allen key 3 mm.
- 1 Allen key 4 mm.
- 1 Allen key 5 mm.

1. Switch off the main power switch on the control panel.

2. Remove the seat cushion by lifting it straight up.

3. Remove the seat plates, they are fitted with four screws at the back and front edge. See fig. 175.

4. Remove the UniTrack rail on the right hand side of the seat. It is assembled with two screws. See *UniTrack rails*, Page 108.

5. Disconnect the Tilt motor cabling from the contact block at the seat frame. Release the cable from its cable brackets on the right hand side of the seat. Make note of how the cable is assembled with consideration to subsequent assembling. See *AP Elevator Tilt Motor Cabling*, Page 77.

Figure 175. The seat plates are held in place by four screws.

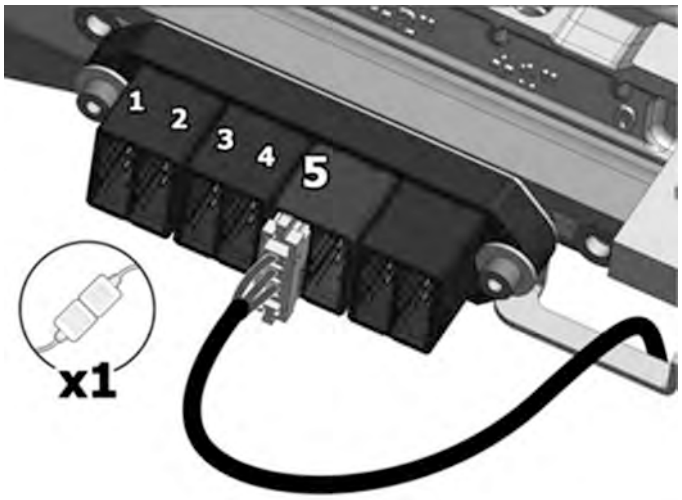

Figure 176. The Tilt Motor Cable is connected to the fifth position of the connector block.

6. Disconnect the cable that connects the ISC Master Module to the contact block at the seat frame. See fig. 177. Release the cable from its cable brackets on the seat frame and AP-Elevator. Make note of how the cables are assembled on the seat frame with consideration to subsequent assembling. See *Rnet and ICS bus cable mounting*, Page 81.

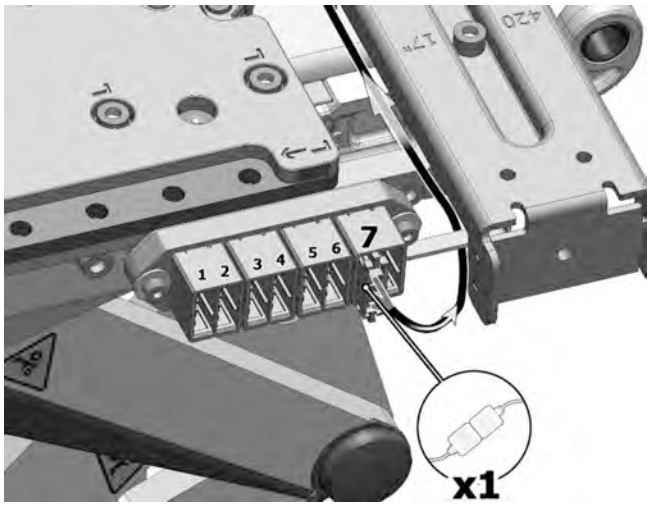

Figure 177. The ICS bus cable is connected to the seventh position of the connector block.

7. Remove the cover on the back of the back rest. It is attached with two screws. See fig. 178.

8. Disconnect the Rnet cable from the contact block at the back of the back rest. See fig. 178. Release the cable from its cable brackets on the right hand side of the seat. Make note of how the cable is assembled with consideration to subsequent assembling. See *Rnet and ICS bus cable mounting*, Page 81.

Figure 178. Disconnect the Rnet cable from the contact block at back of the back rest.

Remove the six screws holding the seat. See fig. 179. Make note of in what hole pattern the seat is assembled with consideration to subsequent assembling.

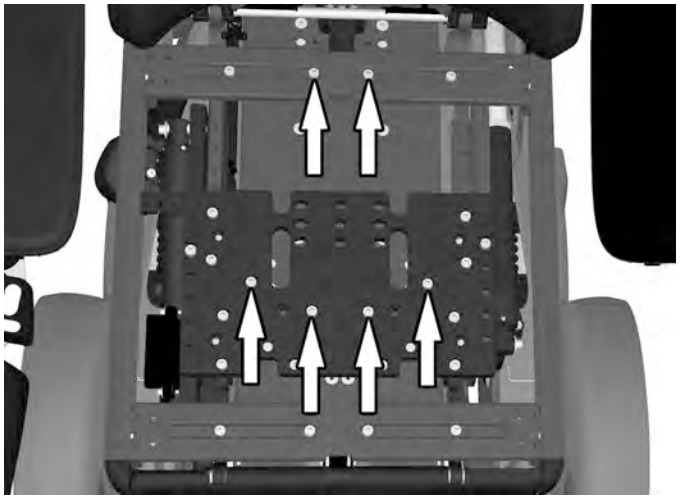

Figure 179. The seat is assembled with six screws.

9. Lift the seat off the AP Elevator.

Assembly

1. Position the seat on to the AP Elevator.

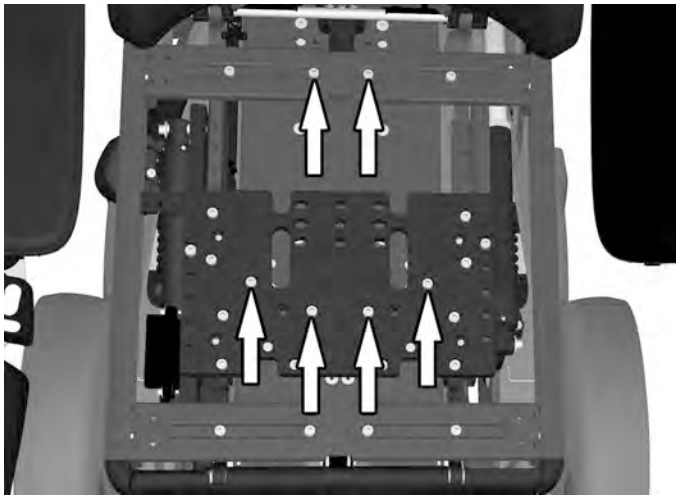

Figure 180. The seat is assembled with six screws.

2. Assemble the six screws holding the seat. See fig. 180. The seat must be assembled in different hole patterns pending on the seat depth setting. See table and fig. 181.

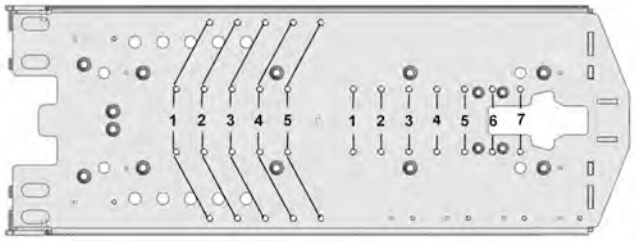

Figure 181. The different assembling positions.

Assembling positions					
Seat Depth mm	Seat Depth inches	Front Position	Rear position	Front Ext.	Rear Ext.
370	15”	1	1	0	-100
395	16”	1	2	0	-75
420	17”	3	3	+50	-100
445	18”	3	4	+50	-75
470	19”	3	5	+50	-50
495	20”	3	6	+50	-25
520	21”	3	7	+50	0
545	22”	3	7	+75	0
570	23”	3	7	+100	0

3. Connect the Rnet cable to the contact block at the back of the back rest. See fig. 182. Assemble the cable to its cable brackets. See *Rnet and ICS bus cable mounting*, Page 81.

Figure 182. Reconnect the Rnet cable from the contact block at back of the back rest.

4. Connect the cable that connects the ISC Master Module to the contact block at the seat frame. See fig. 183. Mount the cable to its cable brackets on the seat frame. See *Rnet and ICS bus cable mounting*, Page 81.

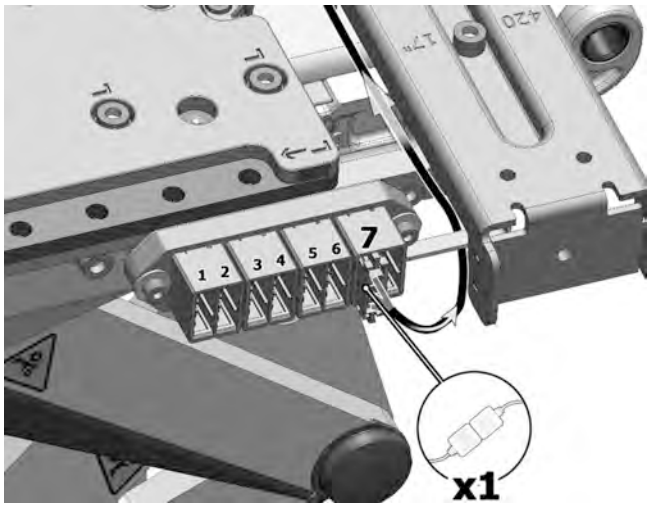

Figure 183. The ICS bus cable is connected to the seventh position of the connector block.

5. Connect the tilt motor cabling to the contact block at the seat frame. See fig. 184. Assemble the cable to its cable brackets. See *AP Elevator Tilt Motor Cabling*, Page 77.

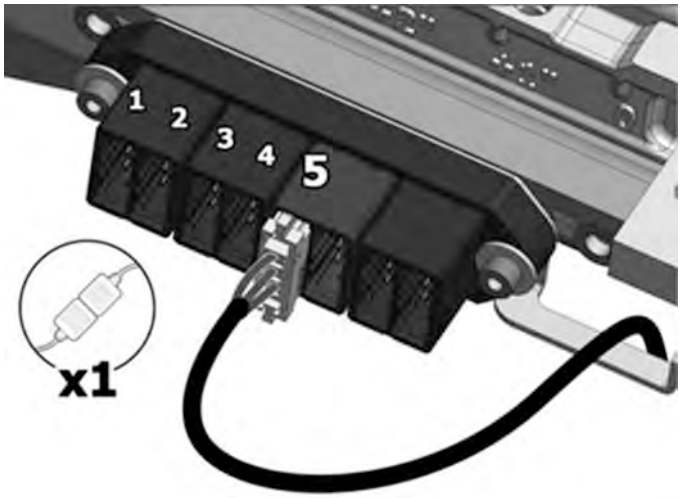

Figure 184. The Tilt Motor Cable is connected to the fifth position of the connector block.

6. Reassemble the cover on the back of the back rest. It is attached with two screws. See fig. 182.

7. Reassemble the seat plates, they are fitted with four screws at the back and front edge. See fig. 185.

Figure 185. The seat plates are held in place by four screws.

8. Reassemble the seat cushion.

UniTrack rails

For this task the following tools are necessary:

- 1 Allen key 5 mm.

UniTrack rails are available in five different lengths that are used depending on the seat depth selected.

Removal

1. Remove the two screws that hold the rail in place. See fig. 186.

Assembly

1. Assemble the UniTrack rail using two screws. See fig. 186. Use a torque wrench to tighten the screws. **Tightening torque 9.8 Nm / 7.2 Ft/lbs.**

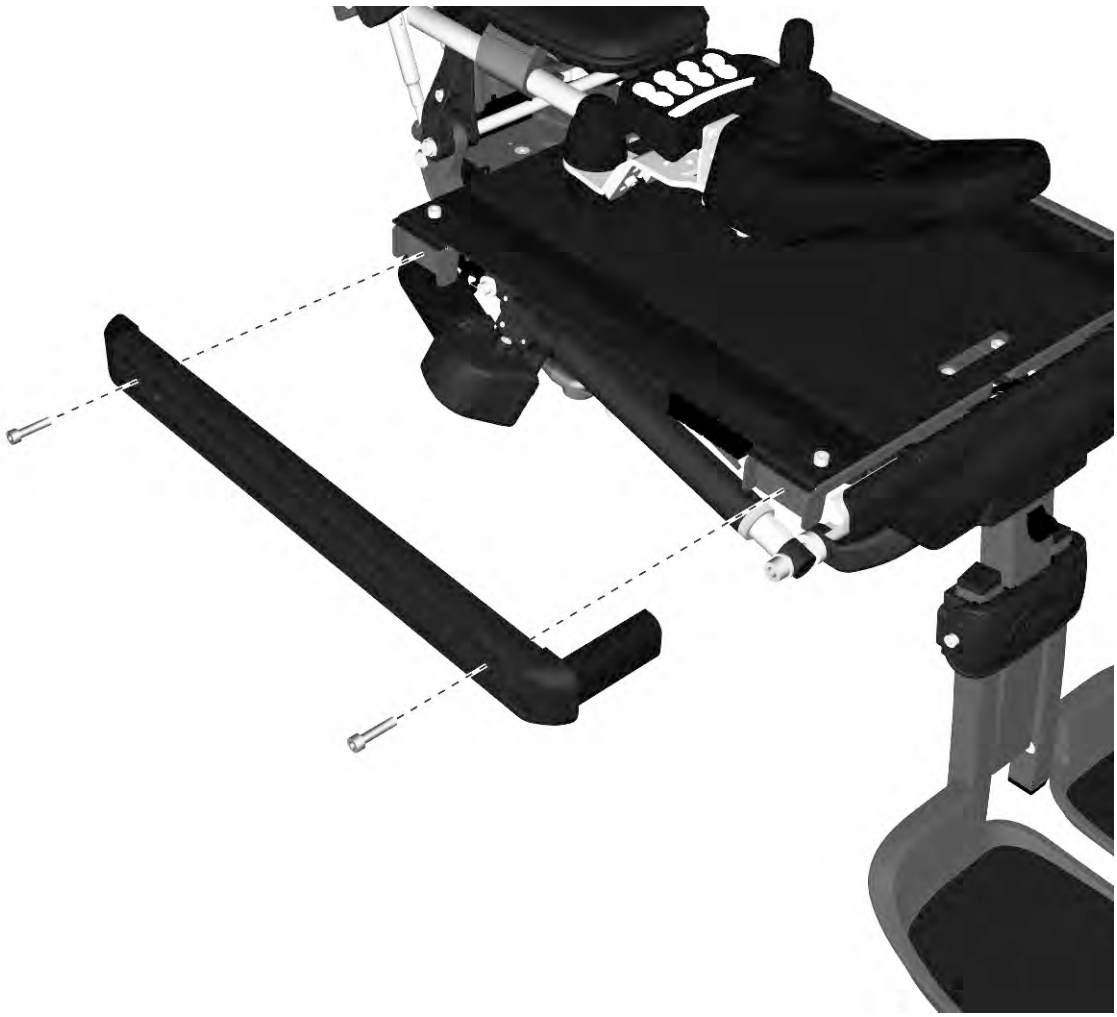

Figure 186. The UniTrack rail is held in place by two screws.

Seat plates

For this task the following tools are necessary:

- 1 Allen Key 4 mm.

Removal

1. Remove the seat cushion by lifting it straight up. It is attached by means of Velcro on the rear of the cushion.
2. Remove the seat plates, which are held in place by four screws. See fig. 187.

Assembly

1. Assemble the seat plates with the four screws.
2. Fit the seat cushion by pressing it against the seat plate in the desired position to ensure good contact for the Velcro on its underside.

Figure 187. The seat plates are held in place by four screws.

Backrest plates

For this task the following tools are necessary:

- 1 Allen Key 4 mm.

Backrest plates are available in three different widths to fit most users. If you change the size of the backrest plates you will also have to change the cushion to one that is a suitable size. See *Recommended cushions, seat plates and UniTrack rails*, Page 177.

Removal

1. Remove the backrest cushion by pulling it straight forwards. It is attached by means of Velcro on the rear of the cushion.
2. Remove the backrest upper plate. For access to the locking mechanism, set the backrest angle to its most upright position. Remove the upper section of the backrest by carefully opening the locking mechanism catch outwards while also pulling the upper section of the backrest straight up. See fig. 188.
3. Remove the knob securing the position of the lower backrest plate. See fig. 189.

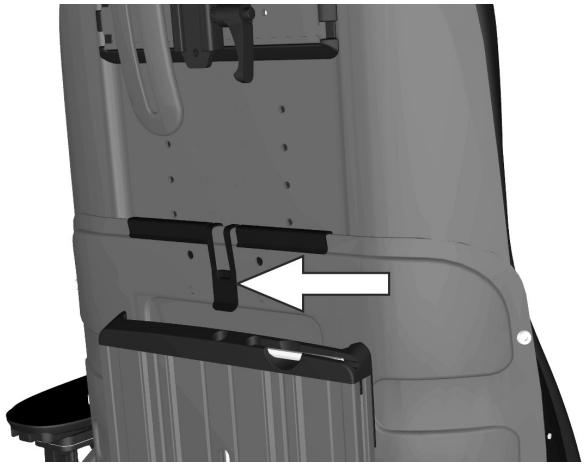

Figure 188. The upper section of the backrest is secured with a locking mechanism.

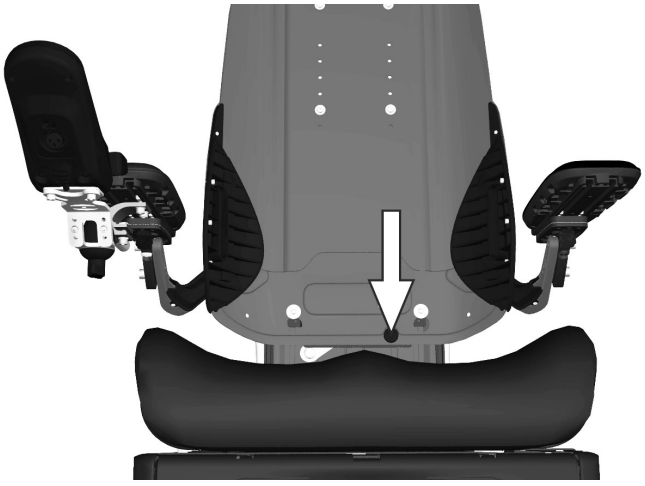

Figure 189. The lower backrest plate is secured by means of a knob.

4. Remove the lower section of the back rest by pulling the backrest plate straight up so it can be removed from the four locking devices. See fig. 190.

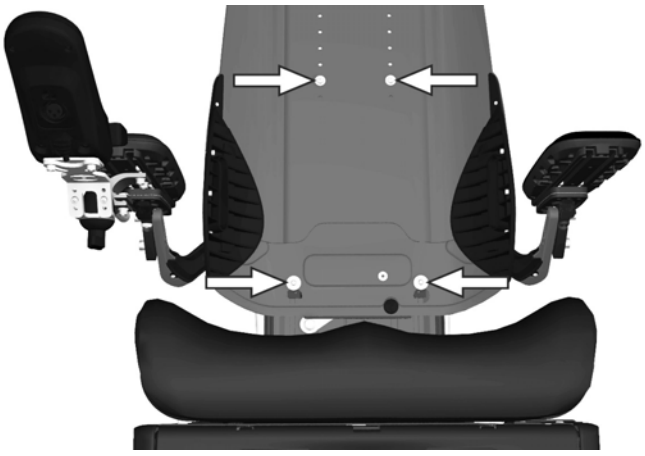

Figure 190. The lower backrest plate is secured by means of four locking devices.

Assembly

1. Assembly the lower backrest plate by lining up the four "keyholes" on the locking devices and then sliding the plate straight down. See fig. 191.

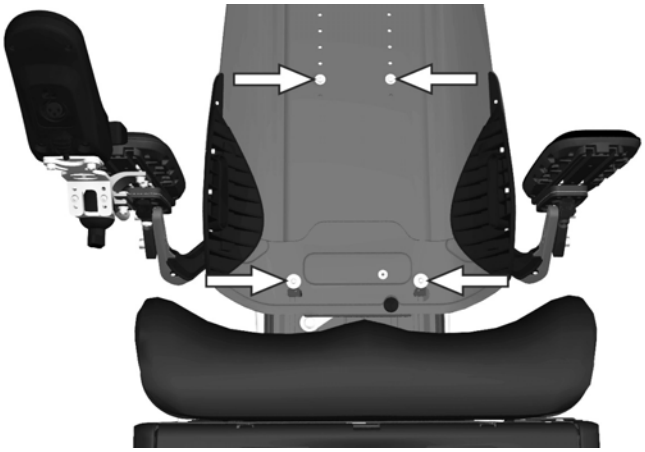

Figure 191. The lower backrest plate is secured by means of four locking devices.

2. Secure the position of the plate by fitting the knob. See fig. 192.

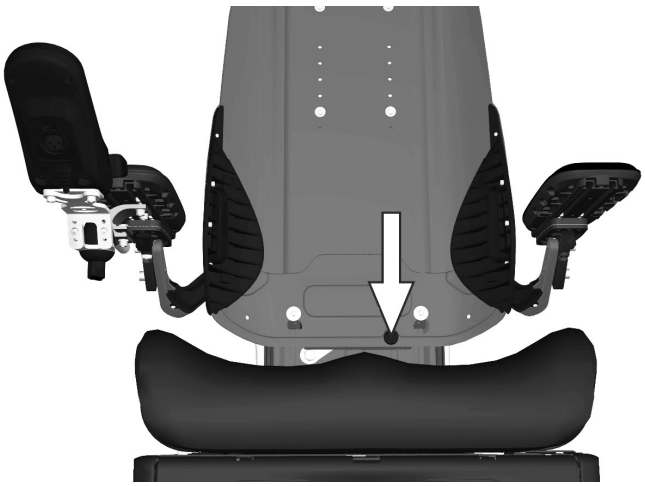

Figure 192. The lower backrest plate is secured by means of a knob.

3. Assemble the upper backrest plate by sliding it down into the lower plate's grooves. The height of the backrest may need to be adjusted. See 193.

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Figure 193. Removal/Fitting of the upper section of the back rest.

4. Fit the backrest cushion by pressing it against the plate in the desired position to ensure good contact for the Velcro on its underside. The lower section of the cushion is fastened to the seat plate by means of Velcro.

Armrest height adjustment mechanism

Removal

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key 3 mm.
- 1 Allen key 4 mm.
- 1 Allen key socket 5 mm.

1. Remove the backrest plates. For a detailed description, see *Backrest plates*, Page 110.

2. Loosen the two screws holding the plastic cover to the back of the backrest. Twist the plastic cover downwards. See fig. 194.

3. Remove the BUS contacts from the contact block and divide the cabling for the ICS switchbox at the contacts on the cabling. See fig. 194.

4. Remove the joint for the backrest slide function, which is held in place by one screw. See fig. 195.

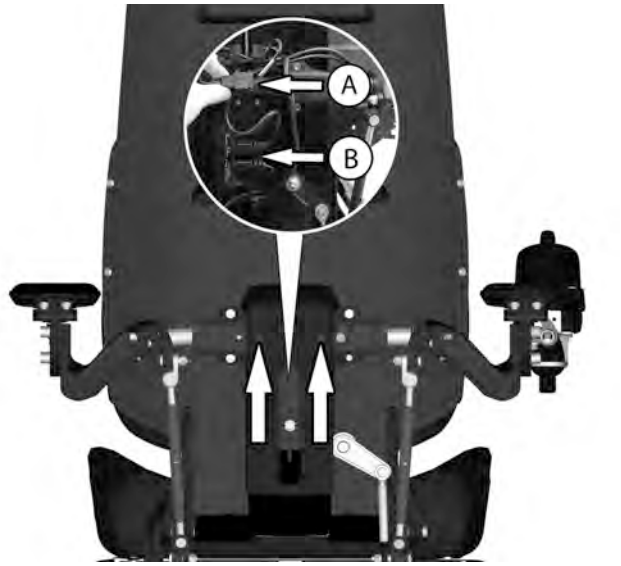


Figure 194. The plastic cover is fixed using two screws.

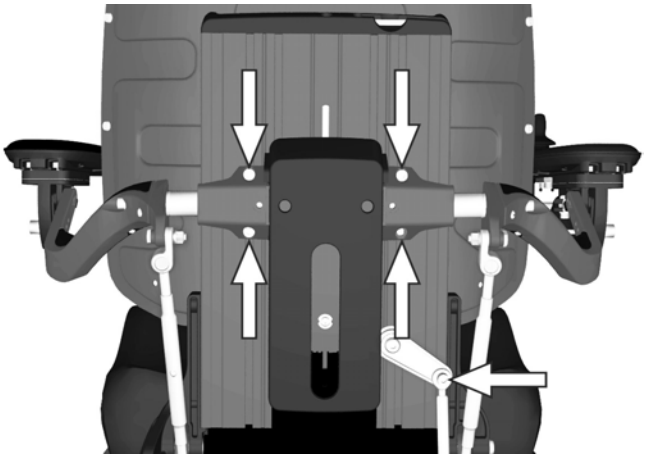


Figure 195. The armrests are held in place by four screws. The joint for the backrest slide function is held in place by one screw.

5. Remove the four screws that hold the armrests in place. See fig. 195.Then carefully move the armrests downwards and backwards.

6. Remove the backrest profile, which is secured using two screws on the left and right. See fig. 196. Remove by undoing the screws and pulling the backrest profile straight up.

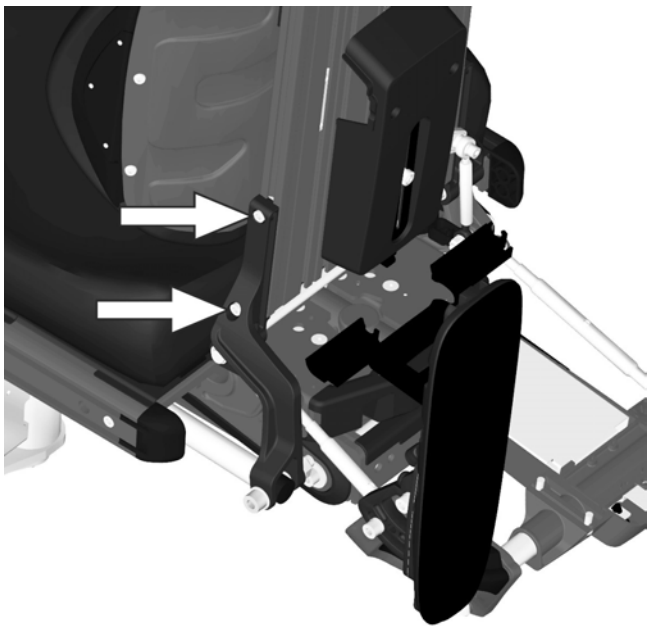


Figure 196. The backrest profile is secured using two screws on the left and right

7. Loosen the screws on the left and right side of the backrest profile and then remove its end cover by sliding it straight out. See fig. 197.

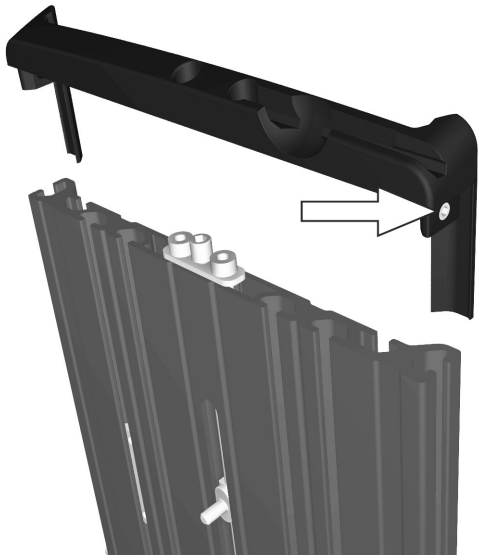


Figure 197. The end cover of the backrest profile is secured using one screw on the left side and one on the right.

8. Remove the adjustment bar brackets, which are each held in place by two screws. See fig. 198.

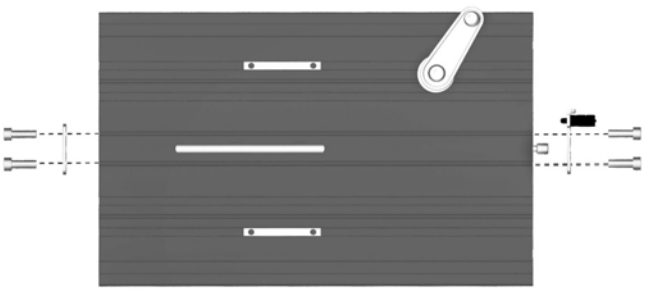


Figure 198. The adjustment bar brackets are each held in place by two screws.

9. Screw the adjustment bar down far enough to be able to prise it up out of the groove on the backrest profile. See fig. 199.

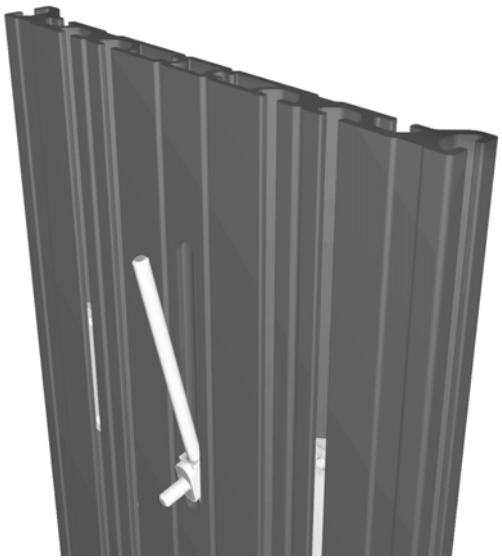


Figure 199. Screw the adjustment bar down far enough to be able to prise it up out of the groove on the backrest profile.

Assembly

1. Push the threaded rod into the backrest profile and at the same time screw on the driver (1). See fig. 200.

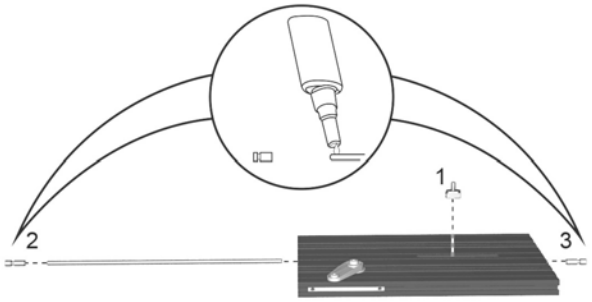


Figure 200. Apply thread locker.

2. Apply thread locker (Loctite 2701) to the ends of the threaded rod and fit the two end pieces (2 & 3) onto the threaded rod. See fig. 200.
3. Assemble the adjustment bar brackets, which are each held in place by two screws. See fig. 201.

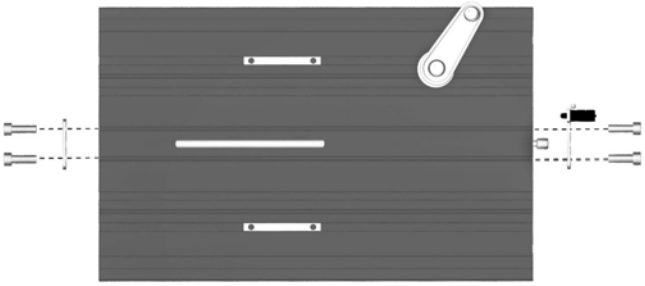


Figure 201. The adjustment bar brackets are each held in place by two screws

4. Reassemble the end cover of the backrest profile by pushing it straight into the end of the profile. Secure the cover by tightening the screws on the left and right. See fig. 202.

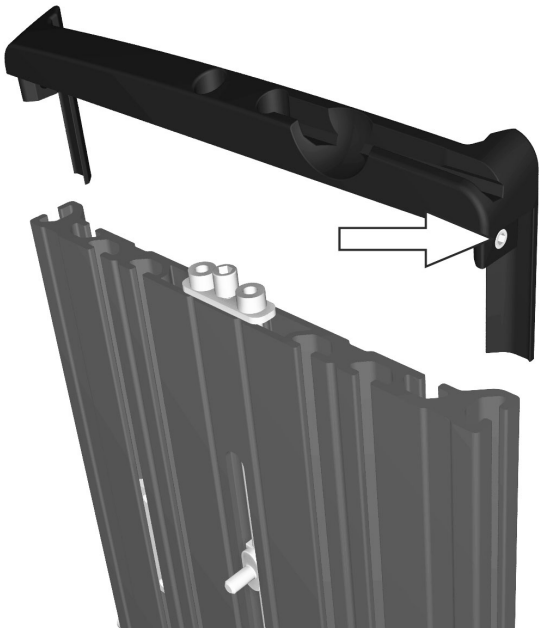


Figure 202. The end cover of the backrest profile is secured using one screw on the left side and one on the right.

5. Reassemble the backrest profile by fitting the bracket into the profile groove on the left and right sides. Slide the profile downwards until the stop on the bracket is touching the end of the backrest profile on both the left side and the right. Secure the backrest profile by tightening the two screws on the left and right. See fig. 203. Tighten the screws using a torque wrench. **Tightening torque 9.8 Nm / 7.2 Ft/lbs.**

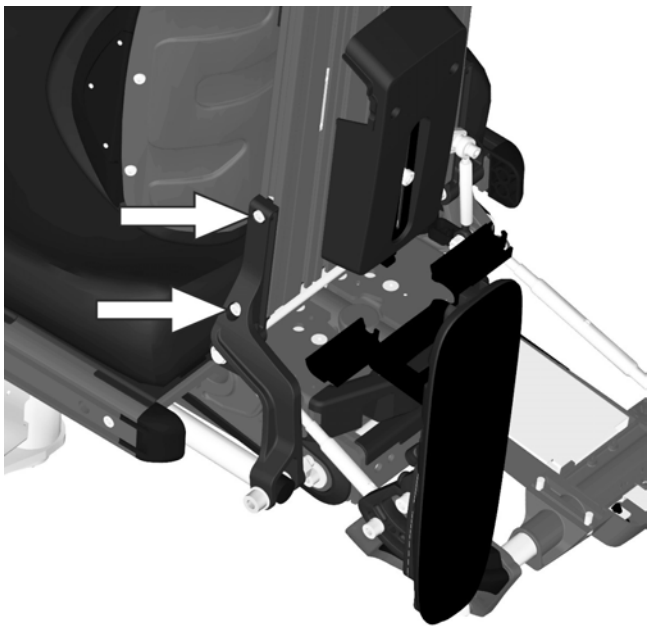


Figure 203. The backrest profile is secured using two screws on the left and right

6. Assemble the armrests using the four screws. See fig. 204. Tighten the screws using a torque wrench. **Tightening torque 9.8 Nm / 7.2 Ft/lbs.**
7. Assemble the joint for the backrest slide function using the screw supplied. See fig. 204. Tighten the screw using a torque wrench. **Tightening torque 9.8 Nm / 7.2 Ft/lbs.**

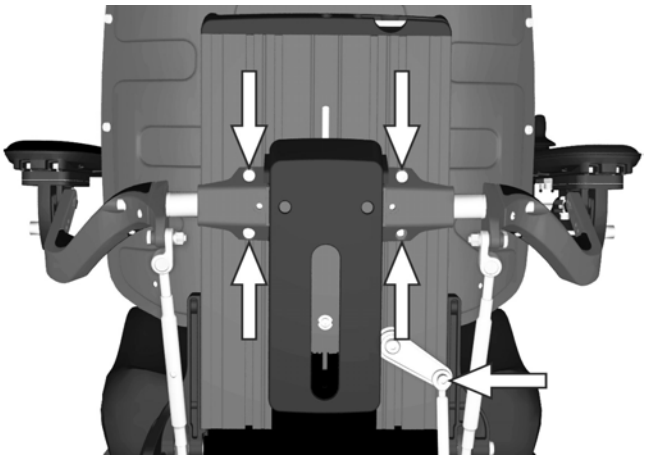


Figure 204. The armrests are held in place by four screws. The joint for the backrest slide function is held in place by one screw

8. Assemble the BUS contacts on the contact block and assemble the cabling for the ICS switchbox at the contact on the cabling. See fig. 194.
9. Reassemble the plastic cover on the back of the backrest using the two screws supplied. See fig. 194.
10. Reassemble the backrest plates. For a detailed description. See *Backrest plates*, Page 110.

Manual Legrest adjustment unit

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key socket 5 mm.
- 1 Allen key socket 8 mm
- 1 Socket 17 mm.

⚠ WARNING!

Do not subject the legrest to load during assembling or removal. Risk of crushing.

Removal

1. Switch off the main power switch on the control panel.
2. Remove the UniTrack rail from the right side of the seat. See *UniTrack rails*, Page 108.
3. Remove the lock nut from the front bracket of the adjustment unit. See fig. 205.
4. Remove the adjustment unit, which is held in place by two screws. See fig. 205.

Assembly

1. Fit the rear fixing screw (M6x12) and washer for the adjustment unit. See fig. 205. Tighten the screw using a torque wrench. **Tightening torque 9.8 Nm / 7.2 Ft/lbs.**
2. Fit the front fixing screw (M10x60), spacer and washer for the adjustment unit. See fig. 205. Tighten the screw using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs.**
3. Fit the lock nut and washer on the front bracket of the adjustment unit. Hold the screw to counteract rotation while tightening the nut. Tighten the nut using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs.** See fig. 205.
4. Assemble the UniTrack rail on the right side of the seat. See *UniTrack rails*, Page 108.

Figure 205. The manual legrest adjustment unit is held in place by two screws.

Manual Backrest adjustment unit

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key socket 5 mm.
- 1 Allen key socket 8 mm
- 1 Socket 17 mm.

⚠ WARNING!

Do not subject the backrest to load during assembling or removal. Risk of crushing.

Removal

1. Switch off the main power switch on the control panel.
2. Remove the UniTrack rail from the left side of the seat. See 108.
3. Hold the backrest in a steady grip as you remove the manual adjustment unit. Remove the nut, washer and screw from the rear bracket of the adjustment unit. See fig. 206. Once the rear bracket has been removed the backrest can be angled forward to rest on the seat cushion.
4. Remove screw and washer from the front bracket of the adjustment unit. See fig. 206.

Assembly

1. Assemble the front end of the adjustment unit with the screw and washer. **Tightening torque 9.8 Nm / 7.2 Ft/lbs.** See fig. 206.
2. Fit the rear fixing screw, spacer and washer for the adjustment unit. Tighten the screw using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs.** See fig. 205. See fig. 206.
3. Fit the lock nut and washer on the rear bracket of the adjustment unit. Hold the screw to counteract rotation while tightening the nut. Tighten the nut using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs.**
4. Assemble the UniTrack rail on the left side of the seat. See *UniTrack rails*, Page 108.

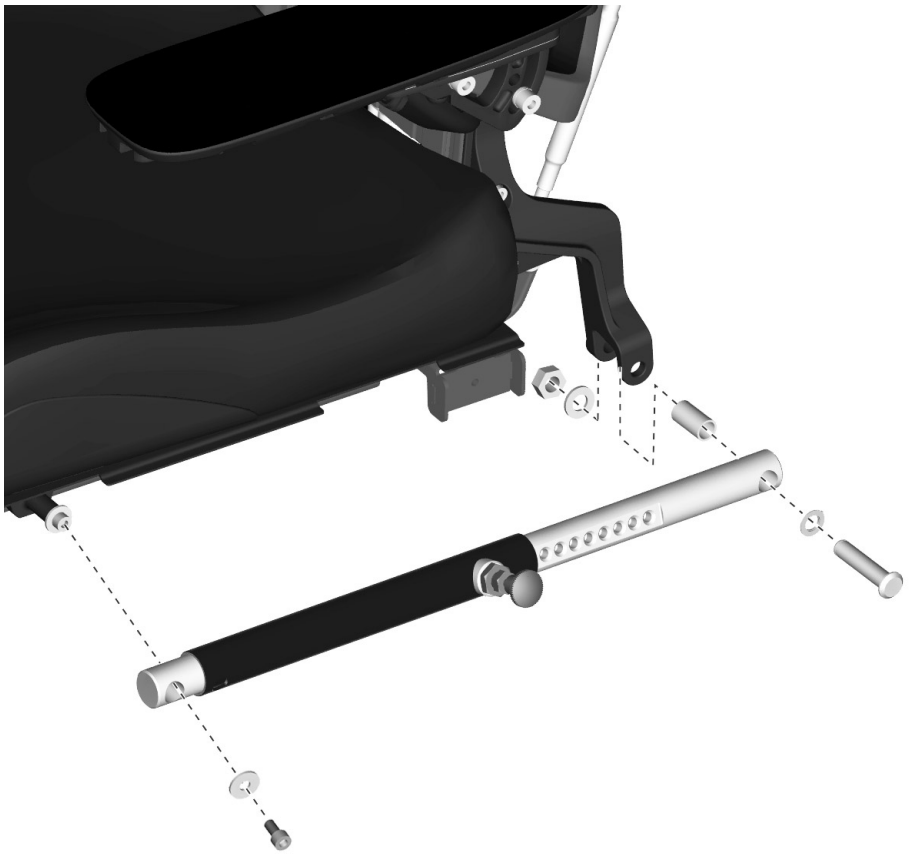


Figure 206. The manual backrest adjustment unit is held in place by two screws.

Legrest actuator

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key socket 5 mm.
- 1 Allen key socket 8 mm
- 1 Socket 17 mm.

Removal

⚠ WARNING!

Do not subject the legrest to load during assembling or removal. Risk of crushing.

1. Switch off the main power switch on the control panel.
2. Remove the UniTrack rail from the right side of the seat. See page *UniTrack rails*, Page 108.
3. Remove the actuator contact from the contact block above the actuator. See fig. 207. Remove the contact by pulling it straight out. Loosen the actuator cabling from its fixing points. Remember how the cabling is positioned; this helps when you come to re-attach it.
4. Remove the lock nut from the front bracket of the actuator. See fig. 208.
5. Remove the actuator, which is held in place by two screws. See fig. 208.

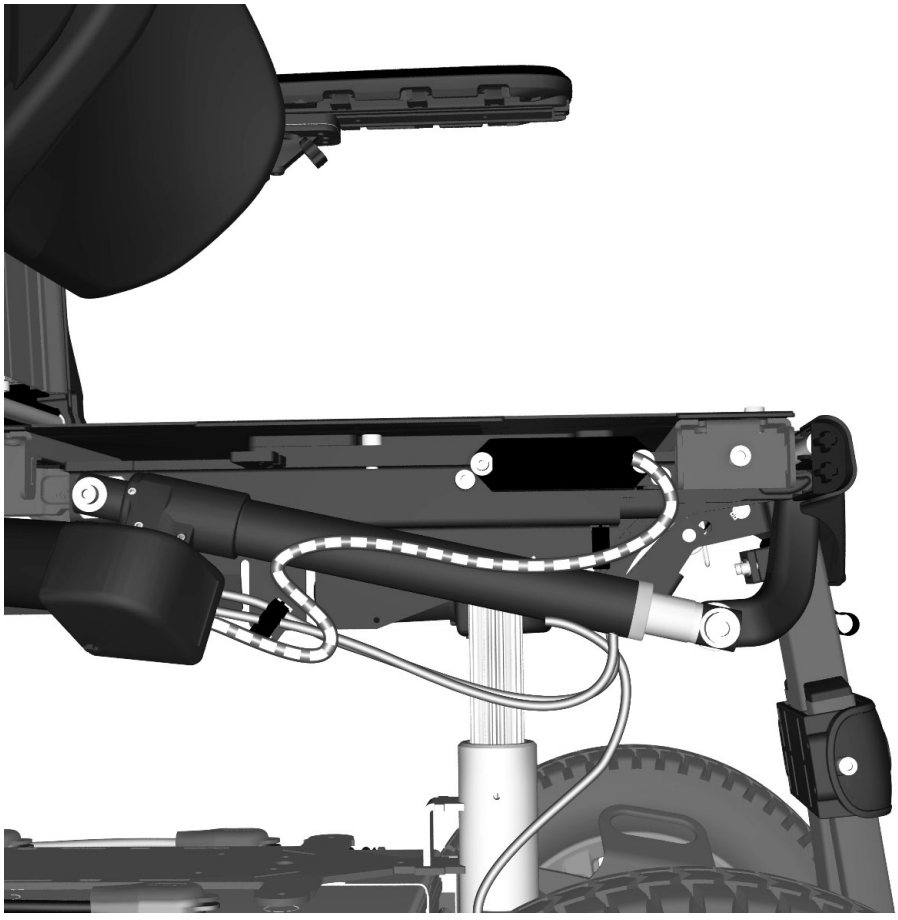


Figure 207. Actuator cabling.

Assembly

1. Fit the rear fixing screw (M6x12) and washer for the actuator. See fig. 208. Tighten the screw using a torque wrench.
   Tightening torque 9.8 Nm / 7.2 Ft/lbs.
2. Fit the front fixing screw (M10x60), spacer and washer for the actuator. See fig. 208. Tighten the screw using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs**
3. Fit the lock nut and washer on the front bracket of the actuator. Hold the screw to counteract rotation while tightening the nut. Tighten the nut using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs** See fig. 208.
4. Secure the cabling for the actuator in its fixing points. Consider the arrangement of the cables carefully and make sure there is no risk of them getting trapped or otherwise damaged.
   Connect the actuator contact to the contact block on the right side of the seat. See fig.207 . Fit the contact by pushing it straight in at any point.
5. Assemble the UniTrack rail on the right side of the seat. See *UniTrack rails*, Page 108.

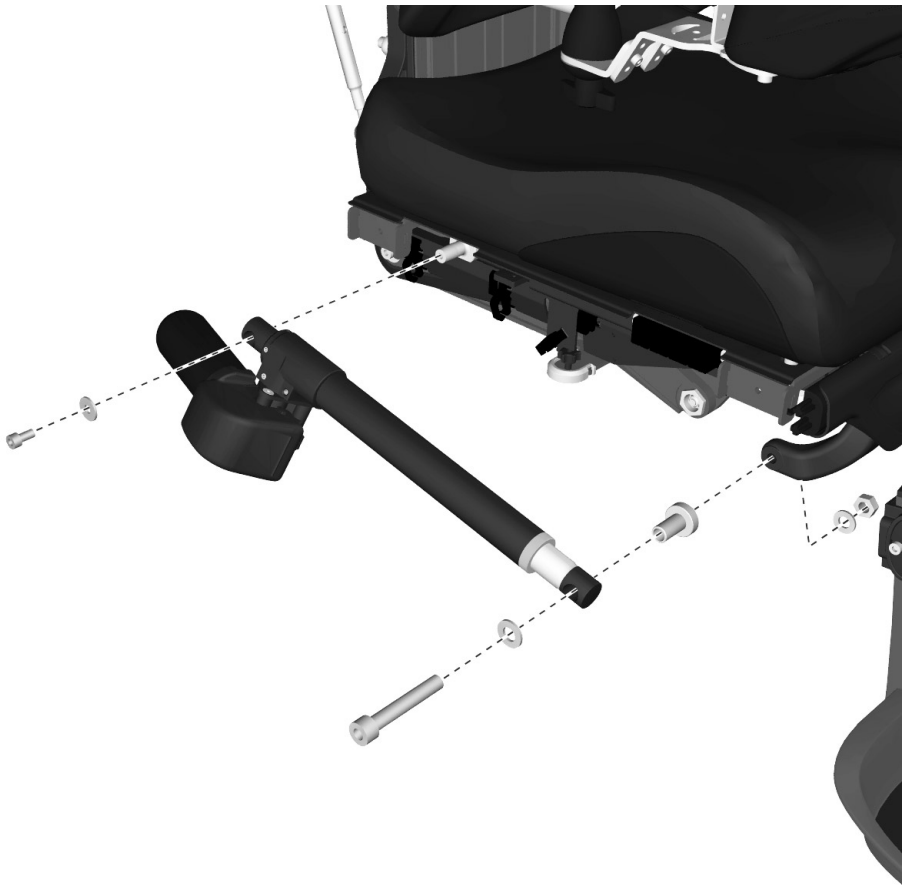


Figure 208. The legrest actuator is held in place by two screws. The actuator cabling is connected to the contact block above the actuator.

Backrest actuator

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key socket 5 mm.
- 1 Allen key socket 8 mm
- 1 Socket 17 mm.

⚠ CAUTION!

Do not subject the legrest to load during assembling or removal. Risk of crushing.

Removal

1. Switch off the main power switch on the control panel.
2. Remove the UniTrack rail from the left hand side of the seat. See *UniTrack rails*, Page 108.
3. Remove the seat plates. See *Seat plates*, Page 109.
4. Remove the actuator contact from the contact block on the right side of the seat. See fig. 209. Remove the contact by pulling it straight out. Loosen the actuator cabling from its fixing points. Remember how the cabling is positioned; this helps when you come to re-attach it.
5. Hold the backrest in a steady grip as you remove the actuator unit. Remove the nut, washer and screw from the rear bracket of the actuator. See fig. 210. Once the rear bracket has been removed the backrest can be angled forward to rest on the seat cushion.
6. Remove screw and washer from the front bracket of the actuator. See fig. 210.

Figure 209. Backrest actuator cabling.

Assembly

1. Assemble the front end of the actuator with the screw and washer. **Tightening torque 9.8 Nm / 7.2 Ft/lbs.** See fig. 210.
2. Fit the rear fixing screw, spacer and washer for the actuator. Tighten the screw using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs.** See fig. 210.
3. Fit the lock nut and washer on the rear bracket of the adjustment unit. Hold the screw to counteract rotation while tightening the nut. Tighten the nut using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs.**
4. Secure the cabling for the actuator in its fixing points. Consider the arrangement of the cables carefully and make sure there is no risk of them getting trapped or otherwise damaged.

   Connect the actuator contact to the contact block on the right side of the seat. See fig. 209. Fit the contact by pushing it straight in at any point.
5. Assemble the UniTrack rail on the left side of the seat. See *UniTrack rails*, Page 108.
6. Assemble the seat plates. See *Seat plates*, Page 109.

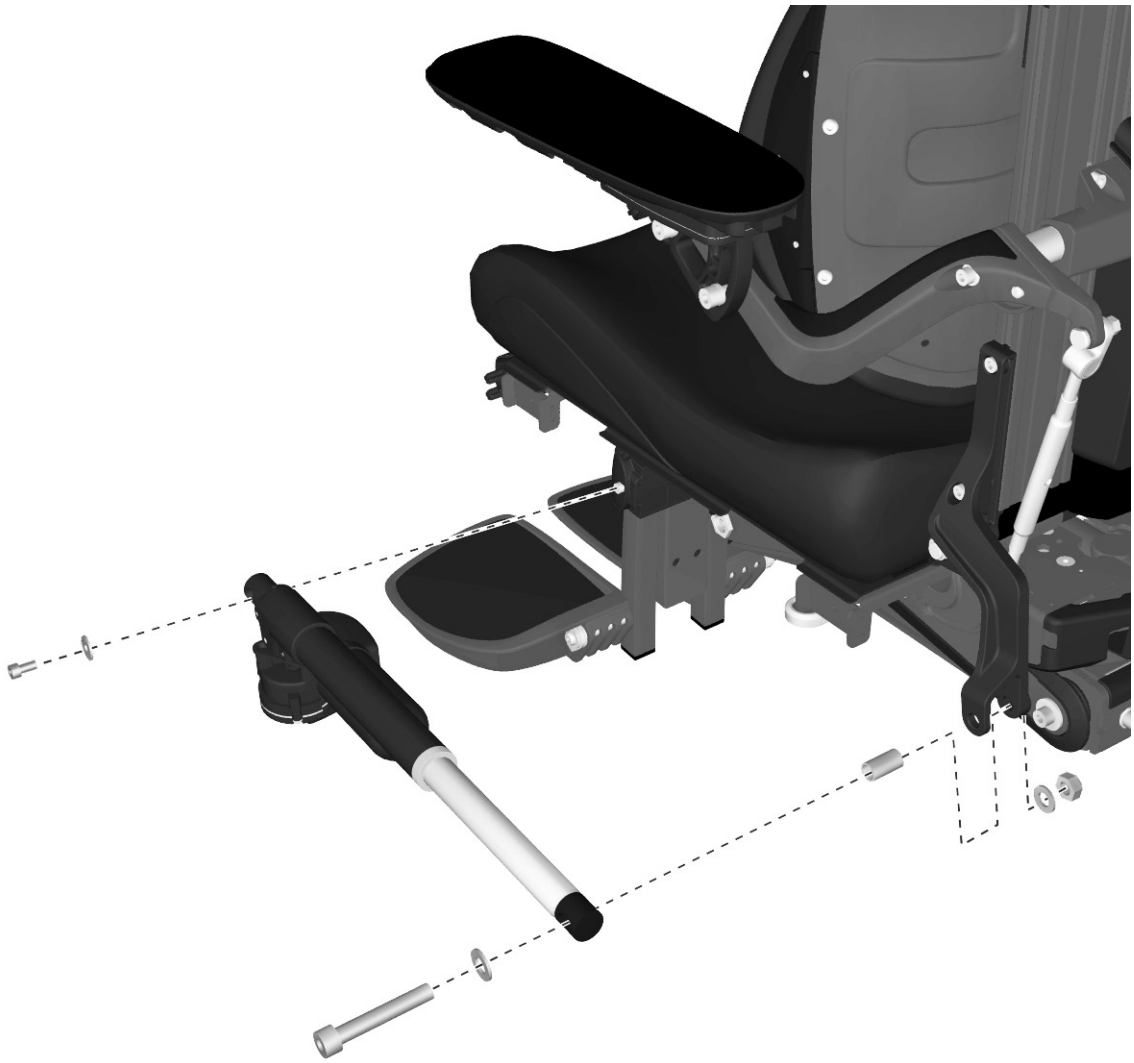


Figure 210. The backrest actuator.

Backrest Actuator Bracket

The backrest actuator bracket provides the backrest with a function that enables it to move slightly forward and then snap to a fixed position in case of a sudden stop when moving fast forward. This function reduces the movement backwards of the user and decreases the risk of injuries sustained to the head, back and neck.

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key socket 5 mm.
- 1 Allen key socket 8 mm.
- 1 Socket 17 mm.
- 1 Allen key 3 mm.

Resetting the function

When triggered, this function needs to be reset before the seat is used again. If the rear edge of the actuator bracket is in line with the seat bar, it means that it hasn't been triggered. But if the actuator bracket is protruding at the rear, the function has been triggered and the bracket must then be reassembled and some parts must be replaced. Parts needed are included in the spare parts kit. Contact Permobil or your dealer for further information.

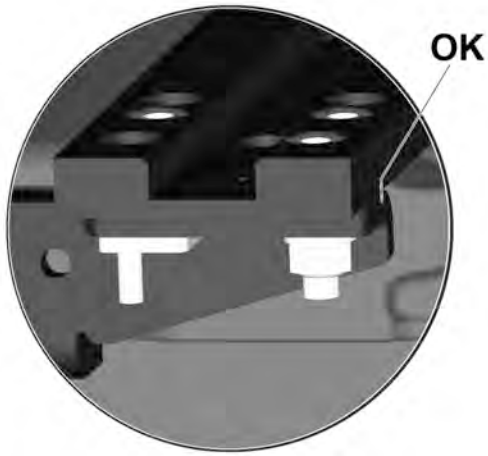


Figure 211. If the rear edge of the actuator bracket is in line with the seat bar, it means that it hasn't been triggered.

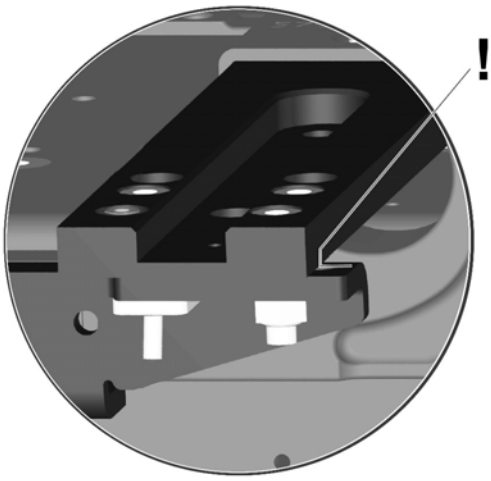


Figure 212. If the actuator bracket is protruding at the rear, the function has been triggered, , the function has been triggered and the bracket must then be reassembled and some parts must be replaced.

Removal

1. Raise the chair to its highest position.
2. Switch off the main power switch on the control panel.
3. Remove the seat cushion.
4. Remove seat plates. See *Seat plates*, Page 109.
5. Remove the UniTrack rail on the left hand side of the seat. See *UniTrack rails*, Page 108.
6. Remove the rear UniTrack rail bracket on the left hand side of the seat, it's attached with two screws. See fig. 213.
7. Remove the rear attachment screw of the back rest actuator. See fig. 214. Fold the backrest forward as the screws are removed to avoid that the backrest is falling backwards.
8. Remove the screws (1), (2) and (3). See fig. 215. Remove the broken part of the screw (2) by screwing it upwards from underneath.
9. Check for damages on other parts and replace if needed.

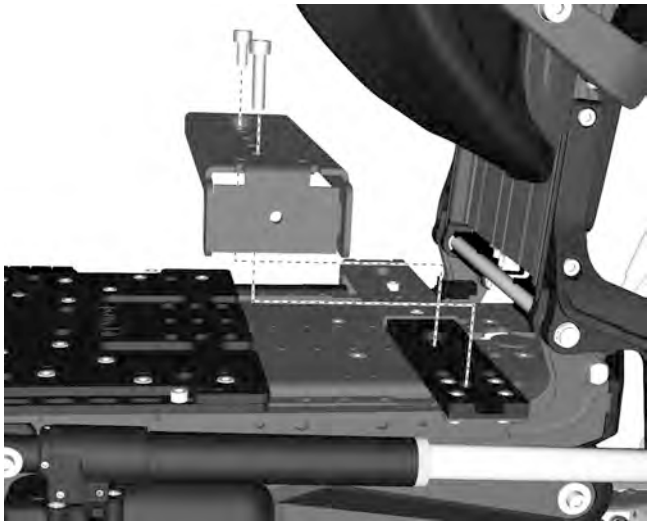


Figure 213. The UniTrack rail brackets is attached with two screws.

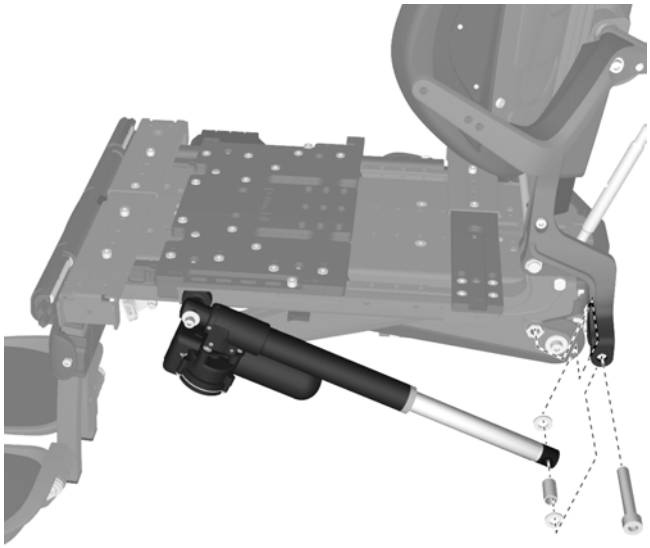


Figure 214. Remove the rear attachment screw of the back rest actuator.

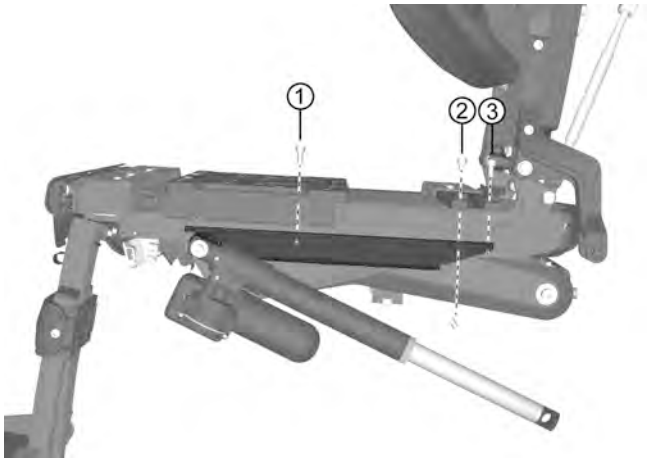


Figure 215. Remove the screws (1), (2) and (3).

Assembly

1. Fit the leaf spring (6) on the actuator bracket. See fig. 216.
2. Fit the key (5) on top of the leaf spring (6). See fig. 216.
3. Fit the bushing (4) on the screw (2). See fig. 216.
4. Fit the actuator bracket on to the seat frame using the screw (2) with bushing (4). See fig. 217.
5. Fit the screw (1) at the front. See fig.217.
6. Fit the screw (3) at the back of the bracket with washer (7) and locknut (8). See fig. 216.
7. Assemble the UniTrack rail bracket. It is attached with two screws. See fig. 218.
8. Assemble the UniTrack rail. See *UniTrack rails*, Page 108.
9. Assemble the seat plates. See *Seat plates*, Page 109.
10. Assemble the seat cushion.

Items	Description
1	Screw, M6x12
2	Screw, M4x20
3	Screw, M6x20
4	Key
5	Leaf spring
6	Bushing
7	Locknut
8	Washer

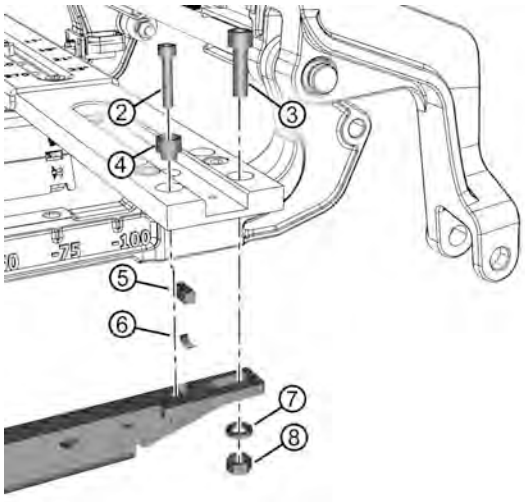


Figure 216. Assembly of the backrest actuator bracket.

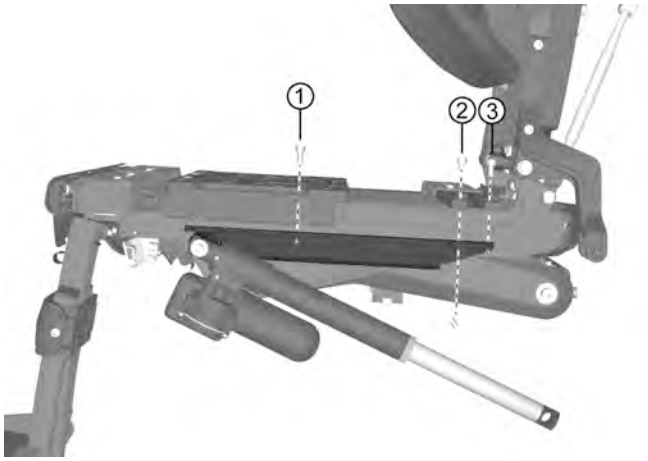


Figure 217. Assembly of the screws (1), (2) and (3).

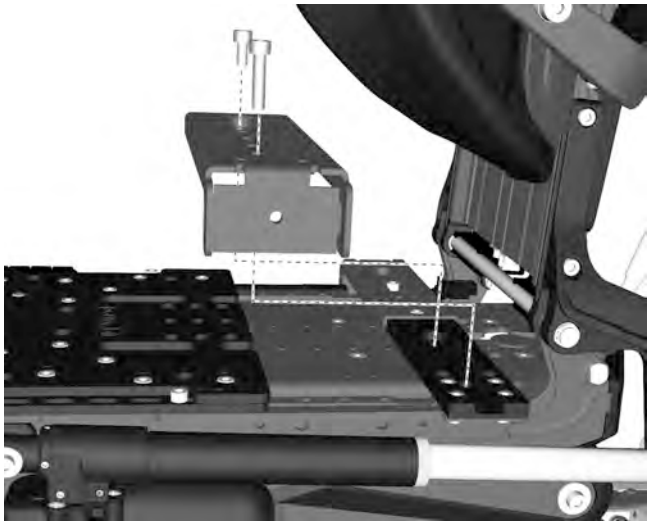


Figure 218. The UniTrack rail brackets is attached with two screws.

Legrest

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key 6 mm.
- 1 Allen key socket 8 mm
- 1 Socket 17 mm.

Removal

1. Switch off the main power switch on the control panel.
2. Remove the leg rest's top cover by carefully pulling it straight out. See 219.

Figure 219. Remove the leg rest's top cover by carefully pulling it straight out.

3. Remove the front ends of the UniTrack rails. See fig. 220.

Figure 220. Remove the front ends of the UniTrack rails.

⚠ WARNING!

Do not subject the legrest to load when adjusting. Risk of crushing.

4. Remove the front bracket of the manual adjustment unit/actuator. See fig. 221. Start with the lock nut and the washer on the inside of the bracket, then remove the screw and washer.

Figure 221. The legrest is held in place by two screws and spacers. The front bracket of the actuator is held in place by a screw and lock nut.

5. Remove the leg rest, which is held in place by two screws and spacers. See 221.

Assembly

1. Assemble the legrest using the two screws and spacers. See fig. 222. Use a torque wrench to tighten the screws. **Tightening torque 24 Nm / 17.7 Ft/lbs.**

Figure 222. The legrest is held in place by two screws and spacers. The front bracket of the actuator is held in place by a screw and lock nut.

2. Assemble the front bracket of the manual adjustment unit/actuator. See fig. 222. Start with the screw and washer. Tighten the screw using a torque wrench. **Tightening torque 24 Nm / 17.7 Ft/lbs.** Then fit the lock nut and washer on the inside of the bracket. Hold the screw to counteract rotation while tightening the nut. Tighten the nut using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs**
3. Assemble the front ends of the UniTrack rails. See fig. 223.

Figure 223. Reassemble the front ends of the UniTrack rails.

4. Assemble the legrest's top cover by carefully pressing its bracket into place on the legrest's fixing screws/ spacers. See fig. 224.

Figure 224. Assemblet the legrest's top cover by carefully pressing its bracket into place on the legrest's fixing screws/spacers.

Legrest strap

For this task the following tools are necessary:

- 1 Allen key 3 mm
- 1 Steel ruler

⚠ WARNING!

Do not subject the legrest to load during assembly or removal. Risk of crushing.

Removal

1. Switch off the main power switch on the control panel.
2. Lift up the legrest's top cover. See fig. 225.
3. Remove one end of the legrest strap by carefully raising the lower section of the legrest slightly and at the same time removing the two screws on the front of the legrest. Then pull the assembling plate out of the loop of the strap. See fig. 226.

   Once the strap is loosened the lower section of the legrest will become loose and can be carefully placed on the floor.
4. Remove the two screws holding the strap bracket on the back of the legrest in place. See fig. 226.
5. Pull the strap out of the legrest mechanism.

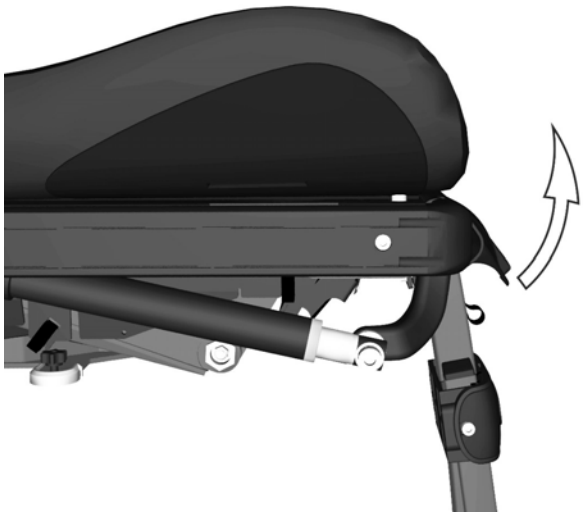


Figure 225. Lift up the legrest's top cover.

Assembly

1. Pull the strap through the bracket on the back of the legrest. Measure to make sure that the strap extends 85 mm from the bracket. Secure the strap by tightening the two screws on the bracket. See fig. 226.
2. Slide the lower section of the legrest up and pull the strap through the legrest mechanism. See fig. 226.
3. Place the assembling plate in the loop of the strap and then assemble this on the front of the legrest using the two screws. See fig. 226.

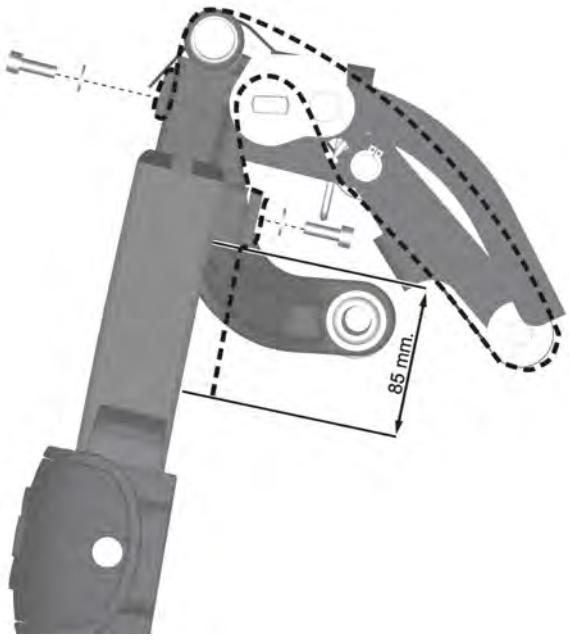


Figure 226. Strap assembling on the legrest.

Legrest slide bushings

Removal

For this task the following tools are necessary:

- 1 Allen key 3 mm.

1. Set the angle of the legrest to its outermost position.
2. Switch off the main power switch on the control panel.
3. Remove one end of the legrest strap by carefully raising the lower section of the legrest slightly and at the same time removing the two screws on the front of the legrest. Pull the assembling plate out of the loop of the strap. See fig. 229.

   Once the strap is loosened the lower section of the legrest will become loose and can be carefully pulled downwards/forwards until the lower section of the legrest is completely loose.

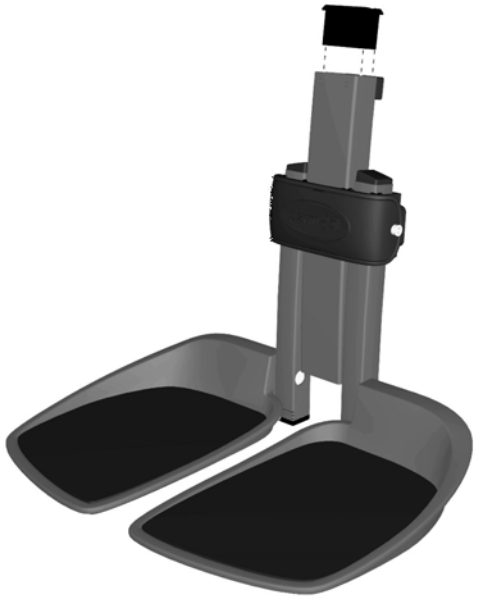


Figure 227. Slide bushing in the lower section of the legrest.

Figure 228. The slide bushing in the upper section of the legrest is attached using two screws.

⚠ WARNING!

Do not subject the legrest to load during assembly or removal. Risk of crushing.

4. Remove the slide bushing in the upper section of the legrest, which is attached using two screws. See fig. 228.
5. Remove the slide bushing in the lower section of the legrest, and at the same time use a suitable tool to press in the locking tabs on the bushing, located in the hole immediately below the top edge of the legrest. See fig. 227.

Assembly

1. Fit the slide bushing in the lower section of the legrest, making sure the locking tabs on the bushing are securely fixed in the hole in the legrest. See fig. 227.
2. Fit the slide bushing in the upper section of the legrest using the two screws. See fig. 228.
3. Slide the upper and lower sections of the legrest together, and pull the legrest strap through the legrest mechanism. See fig. 229.
4. Place the assembling plate in the loop of the strap and then assemble this on the front of the legrest using the two screws. See fig. 229.

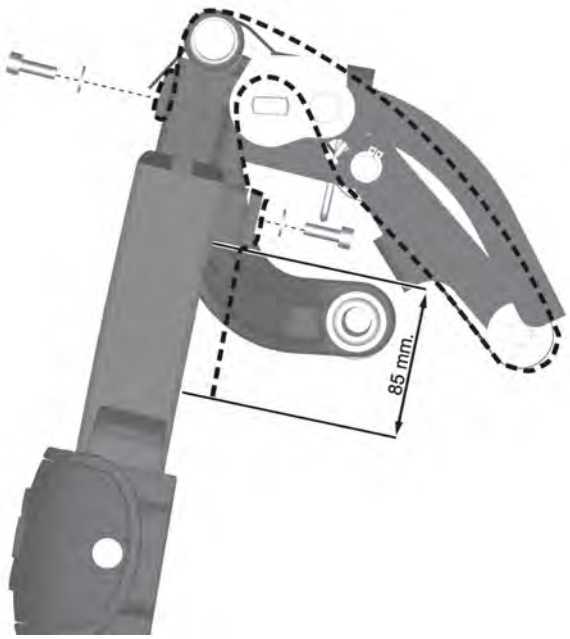


Figure 229. Strap assembly on the legrest.

Articulating Legrest

For this task the following tools are necessary:

- 1 Torque wrench
- 1 Allen key socket 5 mm.
- 1 Allen key socket 8 mm
- 1 Socket 17 mm.

Removal

1. Switch off the main power switch on the control panel.
2. Remove the leg rest's top cover by carefully pulling it straight out. See 230.

Figure 230. Remove the leg rest's top cover by carefully pulling it straight out.

3. Disconnect the articulation actuator by dividing the connector on its cable.
4. Remove the front ends of the UniTrack rails. See fig. 231.

Figure 231. Remove the front ends of the UniTrack rails.

⚠ WARNING!

Do not subject the legrest to load when adjusting. Risk of crushing.

5. Remove the front bracket of the manual adjustment unit/actuator. See fig. 232. Start with the lock nut (7) and the shim washer (6) on the inside of the bracket, then remove the screw (3), washer (4) and spacer (5).

Figure 232. The legrest is held in place by an axle (2) with a circlip (1) on the left and right hand side of the legrest.. The front bracket of the actuator is held in place by a screw (3), washer (4) and shim washer (5) and lock nut (7).

6. Remove the leg rest, which is held in place by a axle (2) with a circlip (1) on the left and right hand side of the legrest. See 232.

Mounting

1. Mount the legrest using the axle and the two circlips. See fig. 233.

Figure 233. The legrest is held in place by an axle (2) with a circlip (1) on the left and right hand side of the legrest.. The front bracket of the actuator is held in place by a screw (3), washer (4) and shim washer (5) and lock nut (7).

2. Mount the front bracket of the manual adjustment unit/actuator. See fig. 233. Start with the screw (3), washer (4) and spacer (5). Tighten the screw using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/ lbs** Then fit the shim washer (6) and lock nut (7) on the inside of the bracket. Hold the screw to counteract rotation while tightening the nut. Tighten the nut using a torque wrench. **Tightening torque: 24 Nm / 17.7 Ft/lbs**
3. Mount the front ends of the UniTrack rails. See fig. 234.

Figure 234. Remount the front ends of the UniTrack rails.

4. Connect the articulation actuator to the connector on its cable.

5. Mount the legrest's top cover by carefully pressing its bracket into place on the legrest's axle. See fig. 235.

Figure 235. Mount the legrest's top cover by carefully pressing its bracket into place on the legrest's fixing screws/spacers.

Footplates

For this task the following tools are necessary:

- 1 Allen key socket 5 mm.

Removal

1. Switch off the main power switch on the control panel.
2. Remove the screw holding the footplate in place. See fig. 236.

> **⚠ WARNING!**
>
> Do not subject the footplate to load during assembly or removal. Risk of crushing.

3. Remove the footplate friction brake by taking the parts off the shaft. See fig. 237.
4. Remove the footplate by taking it off the shaft. See fig. 237.

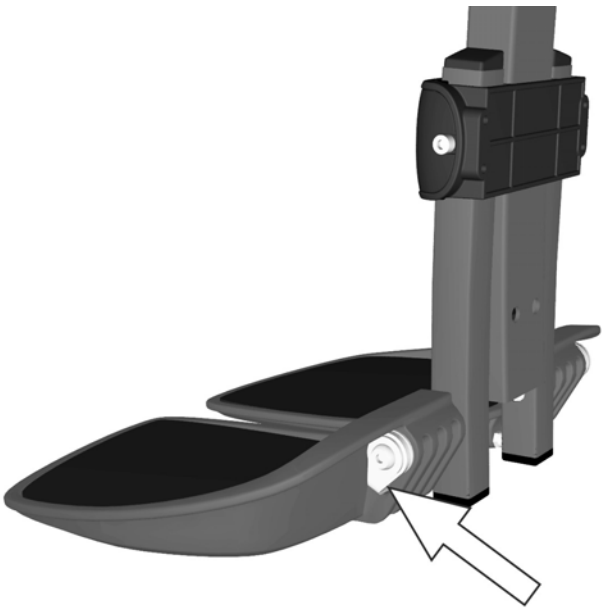


Figure 236. The friction brake's metal butt is in place in the intended hole in the footplate

Assembly

1. Assemble the footplate by sliding it onto the shaft. See fig. 237.

> **⚠ WARNING!**
>
> Do not subject the footplate to load during assembling or removal. Risk of crushing.

2. Assemble the footplate friction brake by sliding the parts onto the shaft. Make sure that the metal butt is positioned in the intended hole in the footplate. See fig. 236.
3. Fit the screw that holds the footplate in place. See fig. 237. Tighten the screw using a torque wrench. **Tightening torque 24 Nm / 17.7 Ft/lbs.**

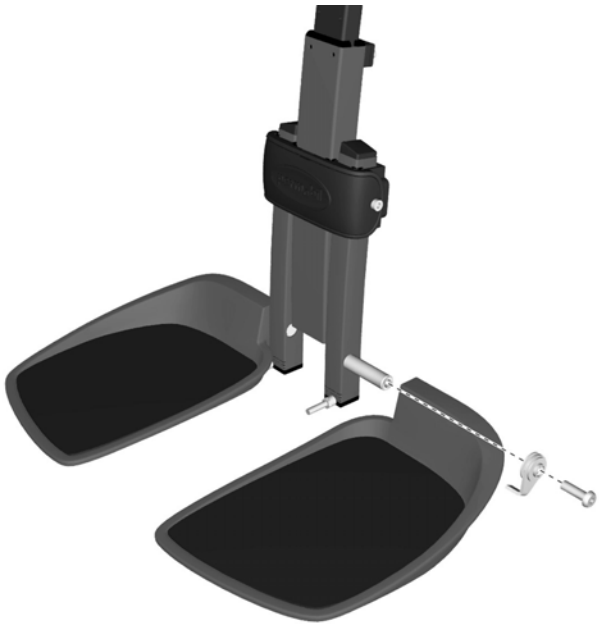


Figure 237. The footplate and its friction brake.

ADJUSTMENTS

Shock absorber adjustment

For this task the following tools are necessary:

- 1 Shock absorber adjustment tool

The spring force of the shock absorber must be adjusted to the correct value.

The spring force can be adjusted to suit different body weights by means of the adjusting nut (A). To get the best comfort and performance the shock absorber should be adjusted according to the table below.

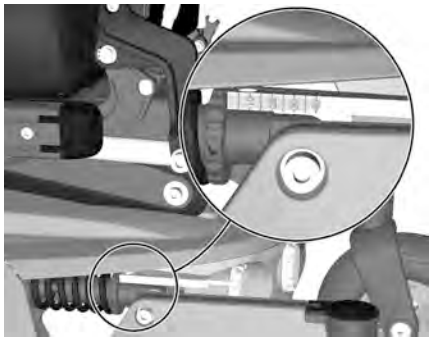


Figure 238. Measure the spring force setting of the shock absorbers.

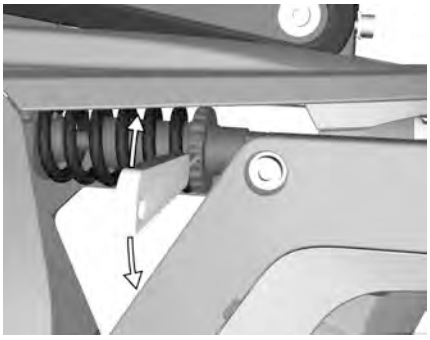


Figure 239. Use the tool to adjust the spring force.

Weight kg	Weight lbs	Setting front	Setting rear
<70	<154 lbs	26 mm	19 mm
70 – 90 kg	154 — 198 lbs	28 mm	21 mm
90 – 120 kg	198 — 265 lbs	31 mm	25 mm
120 - 150 kg	265 — 330 lbs	34 mm	29 mm

Remove the chassis covers to facilitate adjustments of the shock absorbers.

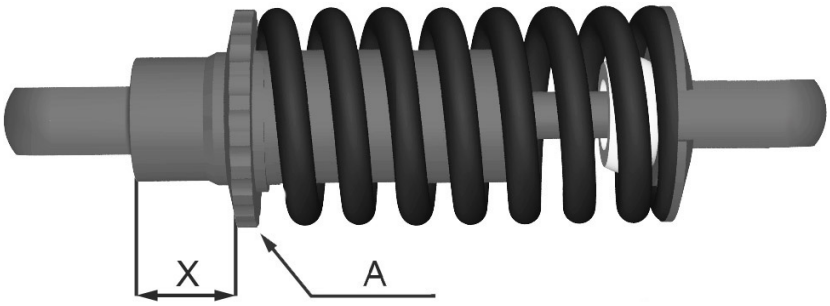


Figure 240. Shock Absorber.

1. Measure to define the present spring force setting of the shock absorbers.
2. Use the tool to rotate the nut clockwise or counter clockwise to increase or decrease the spring force.
3. Measure to make sure that the required setting is achieved. If not, go back to step two.

NOTE!
Make sure to perform this procedure on all shock absorbers.

Friction brake adjustment

For this task the following tools are necessary:

- 1 Spanner 13 mm.

1. Remove the cover (1) on the link arm. See fig 241.
2. Adjust the friction brakes by tightening or loosening the lock nut (2).
3. Drive the chair. If any of the casters flutter, tighten the caster's lock nut ¼ turn. If any casters have difficulty turning, loosen the lock nut ¼ turn. Drive the chair again. Adjust the lock nut until the casters behave as desired.
4. Fit the cover (1) on top of the link arm. See fig 241.

⚠ CAUTION!

Do not use a Pneumatic impact wrench.
Other types of screws or washers are not to be used.
Do not use any other type of thread lock.

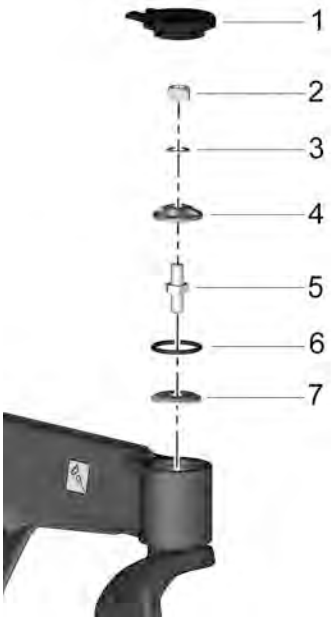


Figure 241. Friction brake.

Seat depth

For this task the following tools are necessary:

- 1 Allen key 4 mm.
- 1 Allen key 5 mm.

The seat depth can be adjusted to suit different users. There are seven fixed levels, each 25 mm / 1” apart.

Adjustment of the seat depth is performed by mounting the front section of the Seat frame incl. Leg rest and the rear section of the seat frame incl. Back rest into desired positions according to the table on 7 and 8. When the seat depth is adjusted it may be necessary to replace cushions, seat plates and UniTrack rails for ones of the appropriate length. The mounting position for the seat on the seat lift/fixed seat column may also need adjusting.

1. Remove the seat cushion by lifting it straight up. It is attached by means of Velcro on the rear of the cushion.
2. Remove the seat plates, which are held in place by two screws at the back edge and two quick-mount clamps at the front. See fig. 242. First remove the screws, then use your hand to carefully push the seat plate from below to release the quick-mount clamps at the front.
3. Remove the UniTrack rails which are each held in place by two screws. See fig. 243.

Figure 242. The seat plates are held in place by two screws at the back edge and two quick-mount clamps at the front.

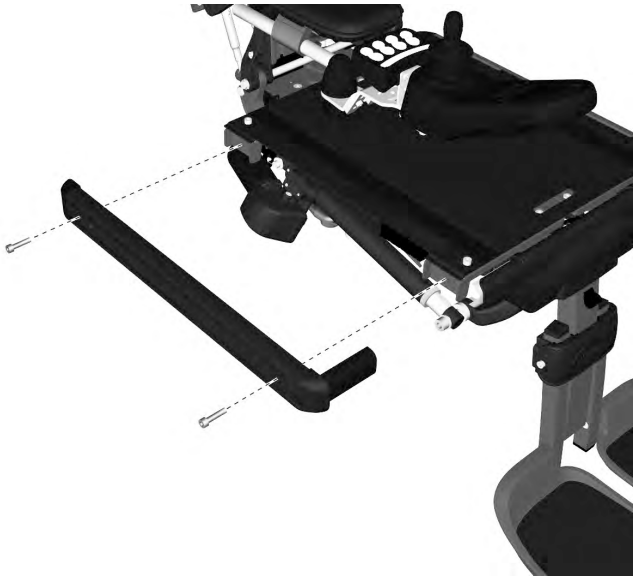


Figure 243. The UniTrack rails are fixed in place with two screws each.

4. **Adjustment of the front section of the Seat frame (Leg rest position):** Remove the five screws marked (L) securing the Seat frames front section. See fig. 244.

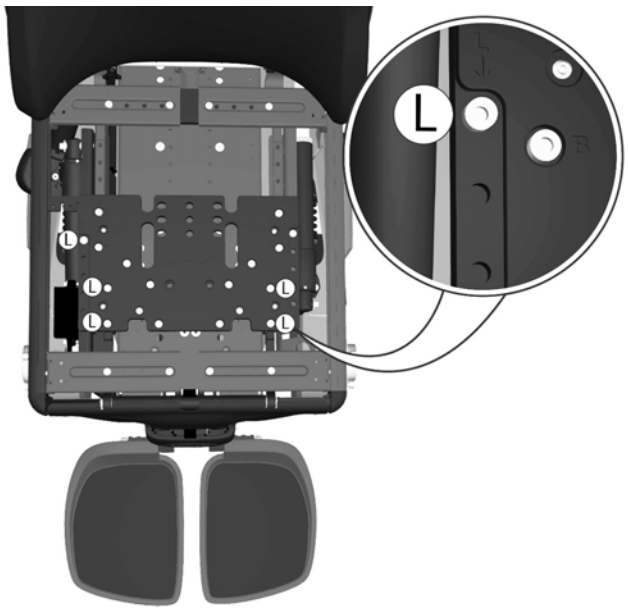


Figure 244. The position of the front part of the Seat frame (Leg rest position) is fixed by five screws marked with the letter L.

5. Adjust the seat depth by moving the front section of the seat frame to the required position. The rails with which the seat depth is adjusted are marked with the settings for each potential position.

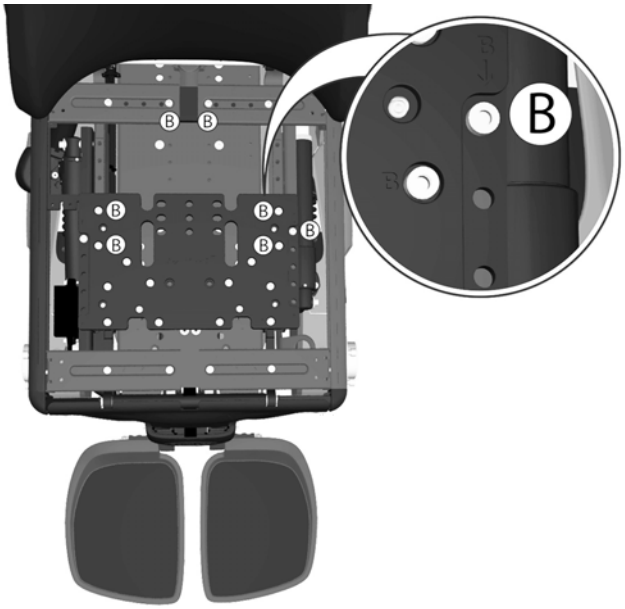


Figure 245. The position of the rear section of the Seat frame (Back rest Position) is fixed by five screws marked with the letter B.

Seat Depth	Leg rest position
370 mm. / 15"	0
395 mm. / 16"	0
420 mm. / 17"	+50 mm / +2"
445 mm. / 18"	+50 mm / +2"
470 mm. / 19"	+50 mm / +2"
495 mm. / 20"	+50 mm. / +2"
520 mm. / 21"	+50 mm / +2"
545 mm. / 22"	+75 mm. / +3"
570 mm. / 23"	+100 mm. / +4"

6. Secure it at the required setting by remounting the five screws.
7. **Adjustment of the rear section of the Seat frame (Back rest position):** Remove the seven screws marked (B) securing the Seat frames rear section, see fig. 245.

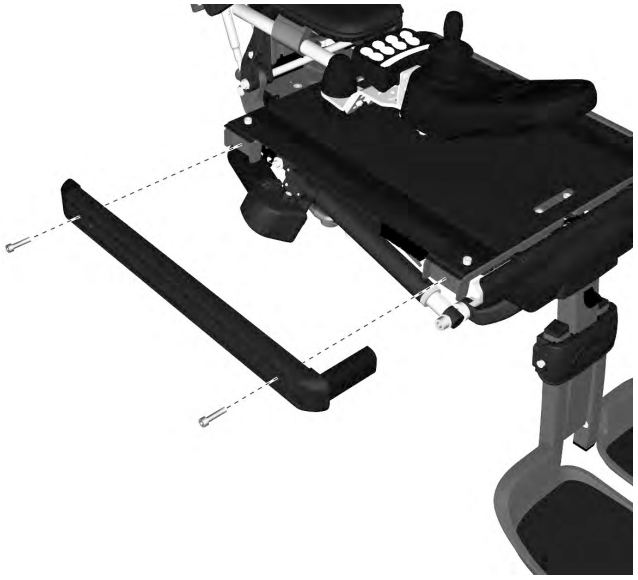


Figure 246. The UniTrack rails are fixed in place with two screws each.

8. Adjust the seat depth by moving the rear section of the seat frame to the required position. The rails with which the seat depth is adjusted are marked with the settings for each potential position. The scale is marked with "millimetres" on one side and "inches" on the other.
9.

Seat Depth	Back rest position
370 mm. / 15"	-100 mm. / -4"
395 mm. / 16"	-75 mm. / -3"
420 mm. / 17"	-100 mm / -4"
445 mm. / 18"	-75 mm / -3"
470 mm. / 19"	-50 mm / -2"
495 mm. / 20"	-25 mm / -1"
520 mm. / 21"	0
545 mm. / 22"	0
570 mm. / 23"	0

   Secure it at the required setting by remounting the five screws.
10. Mount UniTrack rails of a suitable length for the seat depth setting. The rails are each held in place by two screws. See the fig. 246. Use a torque wrench to tighten the screws. **Tightening torque 9.8 Nm / 7.2 Ft/lbs.**

11. Mount seat plates of a suitable length for the seat depth setting. The plates are held in place by two screws at the back edge and two quick-mount clamps at the front. See fig. 247.

Figure 247. The seat plates are held in place by two screws at the back edge and two quick-mount clamps at the front.

12. Fit a cushion of a suitable length/width for this setting. Secure the cushion in place using the Velcro on the back of the cushion.

⚠ WARNING!

The seat's mounting position may need to be changed following adjustment of seat depth. Failure to do this correctly may impair the driving properties of the wheelchair, leading to an increased risk of personal injury and damage to property, including damage to the wheelchair. See *Seat*, Page 103.

Seat width

For this task the following tools are necessary:

- 1 Allen key 4 mm.
- 1 Allen key 5 mm.

The seat width can be adjusted to give the user optimal comfort. There are four fixed levels, each 25 mm / 1” apart.

1. Remove the seat cushion by lifting it straight up. It is attached by means of Velcro on the rear of the cushion.
2. Remove the seat plates, which are held in place by four screws. See fig. 248.
3. Remove the four screws securing the seat width adjustment unit. See fig. 249.
4. Adjust the seat width by moving the right or left section of the seat frame to the required position. The rails with which the seat width is adjusted are marked with the settings for each potential position. The scale is marked with "millimetres" and "inches".
5. Secure it at the required setting by replacing the four screws.
6. Reassemble the seat plates using four screws. See fig. 248.
7. Fit a cushion of a suitable length/width for this setting. See *Recommended cushions, seat plates and Uni-Track rails*, Page 177. Secure the cushion in place using the Velcro on the back of the cushion.

Figure 248. The seat plates are held in place by two screws at the back edge and two quick-assemble clamps at the front.

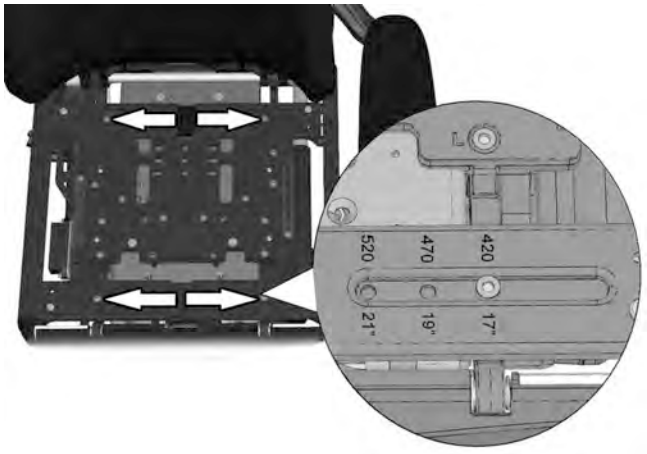


Figure 249. The seat width is fixed using four screws.

Seat height with Seat Tilt Only/Seat Tube Fixed

For this task the following tools are necessary:

- 1 Allen key socket 6 mm.
- 1 Torque wrench
- 1 Spanner 13 mm.

The seat height can be adjusted to give the user optimal comfort. There are three fixed levels, each 25 mm (1") apart.

1. To facilitate adjustment, remove the seat. See *Seat*, Page 103.
2. Remove screw (2) on the left and right hand side of the AP-elevator. See fig. 250 - 252.
3. Tilt the top-plate forward to get access to the nuts mounted inside the AP-elevator on the screws (1). Remove the nuts.
4. Remove screw (1) on the left and right hand side of the AP-elevator. See fig. 250 - 252.
5. Adjust the height to required setting and reassemble the screws (1). Tighten the screws using a torque wrench. **Tightening torque: 25 Nm / 18.4 Ft/lbs.** See fig. 250 - 252.
6. Reassemble the nuts on the inside of the AP-elevator. Hold the screw to counteract rotation while tightening the nuts.
7. Adjust to the same seat height setting as for screws (1) and reassemble the screws (2). Tighten the screws using a torque wrench. **Tightening torque: 25 Nm / 18.4 Ft/lbs.** See fig. 250 - 252.

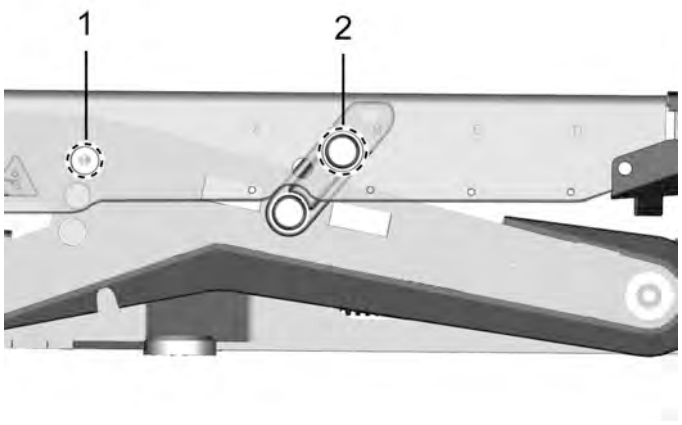


Figure 250. Seat height setting ±0 mm.

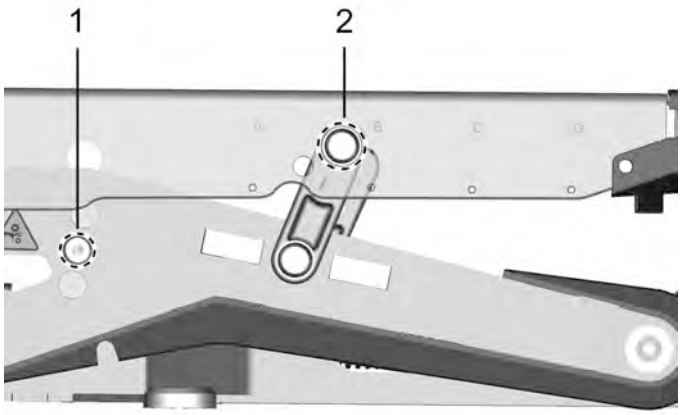


Figure 251. Seat height setting +25 mm (+1”).

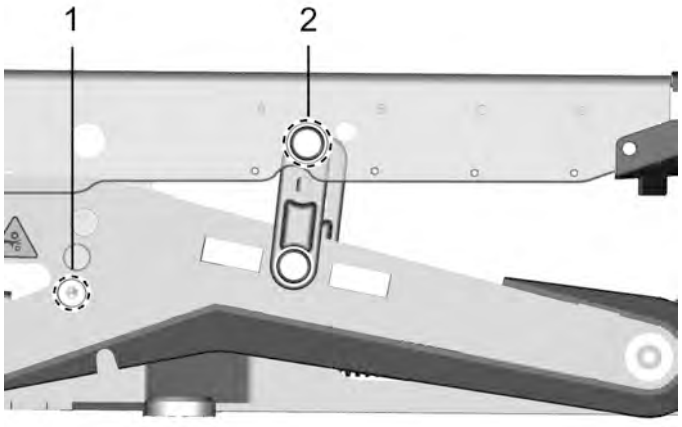


Figure 252. Seat height setting +50 mm (+2”).

Backrest height

For this task the following tools are necessary:

- 1 Allen key 3 mm.

The backrest height can be adjusted to give the user optimal comfort. Adjustment is possible by moving the locking mechanism on the upper section of the backrest between six fixed stages 25 mm / 1” apart.

1. Remove the backrest cushion by pulling it straight forwards. It is attached by means of Velcro on the rear of the cushion.
2. For access to the locking mechanism, set the backrest angle to its most upright position. Remove the upper section of the backrest by carefully opening the locking mechanism catch outwards while also pulling the upper section of the backrest straight up. See fig. 253.
3. Remove the two screws holding the backrest locking mechanism in place. See 254.
4. Adjust the height of the backrest by sliding the upper section upwards/downwards to the required position. The upper backrest plate is marked with the settings for each potential position. The scale is marked with "millimetres" and "inches".

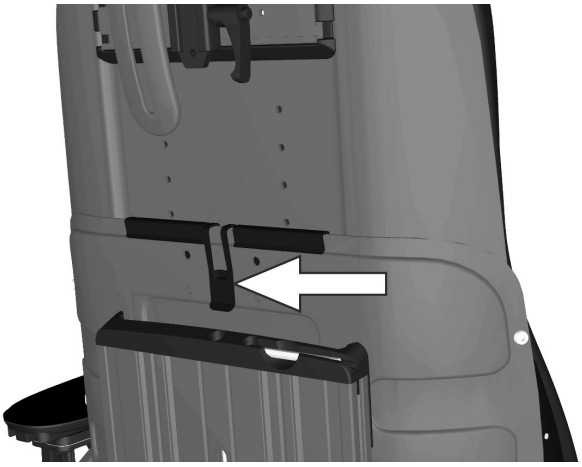


Figure 253. The upper section of the backrest is secured with a locking mechanism.

Figure 254. The locking mechanism is held in place by two screws.

5. Lift up the upper section of the backrest enough that the locking mechanism can be assembled with its top edge in line with the required height on the backrest scale. See the illustration. Assemble the locking mechanism using the two screws.
6. Slide the upper section of the backrest down until secured in position by the locking mechanism. See fig. 253.
7. Fit a cushion of a suitable height/width for this setting. See *Recommended cushions, seat plates and Uni-Track rails*, Page 177. Secure the cushion in place using the Velcro on the back of the cushion.

Figure 255. The backrest locking mechanism assembled for backrest height 645 mm (26 inches).

Armrest height

For this task the following tools are necessary:

- 1 Allen key 5 mm.

The height of the armrest can be adjusted to provide the user with optimal comfort. The scale on the back of the backrest shows the current height setting for the arm rests.

1. Undo the four screws holding the armrest at its current height. See fig. 256.
2. Adjust to the required position using the adjustment screw on the rear of the backrest. See fig. 256.
3. Secure the armrest at the preferred height by tightening the four screws on the rear of the backrest. See fig. 256.

Figure 256. The armrest height is fixed using four screws. To perform this height adjustment, use the adjustment screw in the center of the backrest.

Armrest angle

The angle of the armrest can be easily adjusted to provide the user with optimal comfort.

1. Loosen the check-nut on the adjustmentbar in question. See fig. 257.
2. Adjust the armrest angle by turning the adjustment bars. See fig. 257.
3. Fix into desired position by tightening the check-nut. See fig. 257.

⚠ CAUTION!

Do not subject the armrests to load when adjusting them. Risk of crushing.

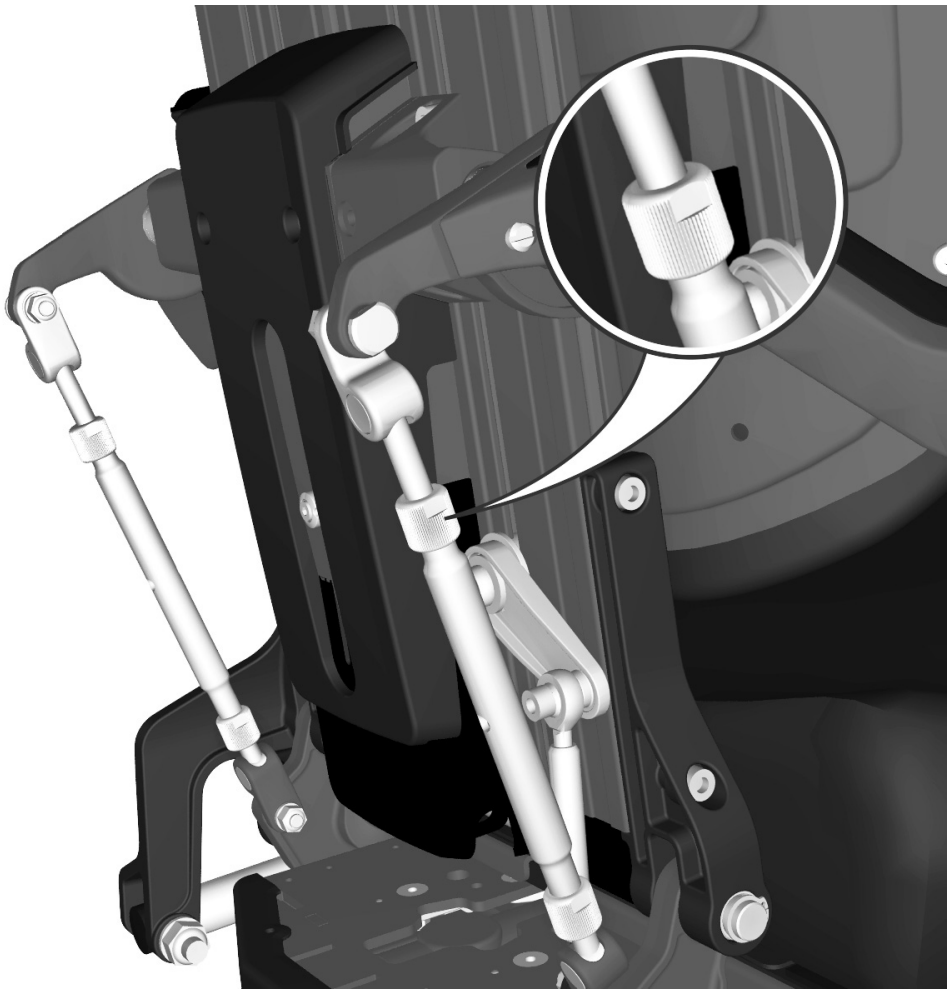


Figure 257. Adjust the armrest angle by turning the adjustment bars. The position of the adjustment bars are fixed by a check-nut

Armrest height/angle - Individual adjustment

For this task the following tools are necessary:

- 1 Allen key 8 mm.

⚠ WARNING!

Do not subject the armrests to load when adjusting them. Risk of crushing. This type of adjustment is only performed in special cases. It may have negative effects on the movement of the armrest when raising/lowering the backrest.

The height/angle of the armrest is normally adjusted as described in *Armrest height*, Page 150 and *Armrest angle*, Page 151. If specifically required, the armrests can be adjusted individually for users who want the left and right armrest at different heights and/or angles. This adjustment is only performed in special cases. It may have negative effects on the movement of the armrest when raising/lowering the backrest.

1. Adjust the armrest height by turning the adjustment bars (C). See fig. 258.
2. The angle of the armrest is secured using a screw. Move the screw from a fixed position (A) to a flexible position (B). See fig. 258.
3. Adjust the armrest to the required angle and secure by tightening the screw. See fig. 258.

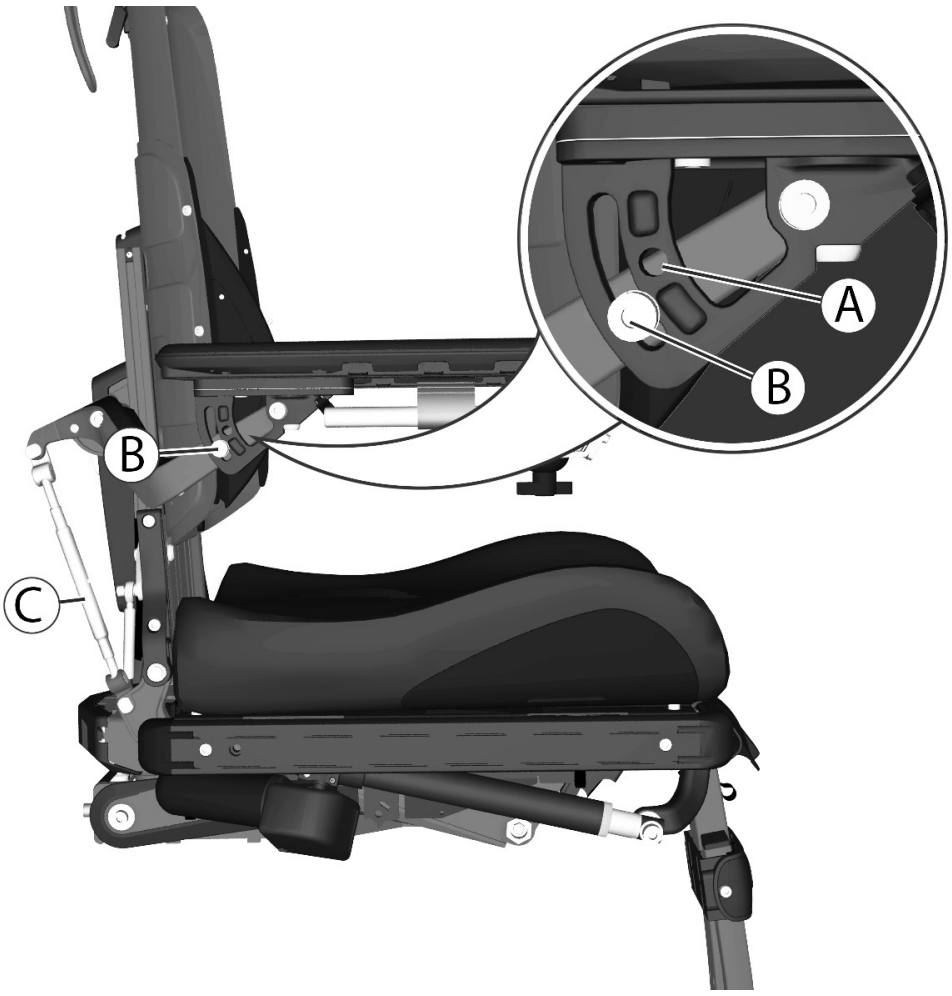


Figure 258. Individual adjustment of the armrest height and angle.

Armrest width

For this task the following tools are necessary:

- 1 Allen key 6 mm.

The distance between the armrests can be adjusted to give the user optimal comfort. Adjustment of the left and right armrests uses three fixed levels, each 25 mm / 1” apart.

1. Loosen the screw for armrest width adjustment approximately 3 turns. See fig. 259.
2. Push in/pull out the armrest shaft to the desired position.
3. Secure it at the required setting by retighten the screw.

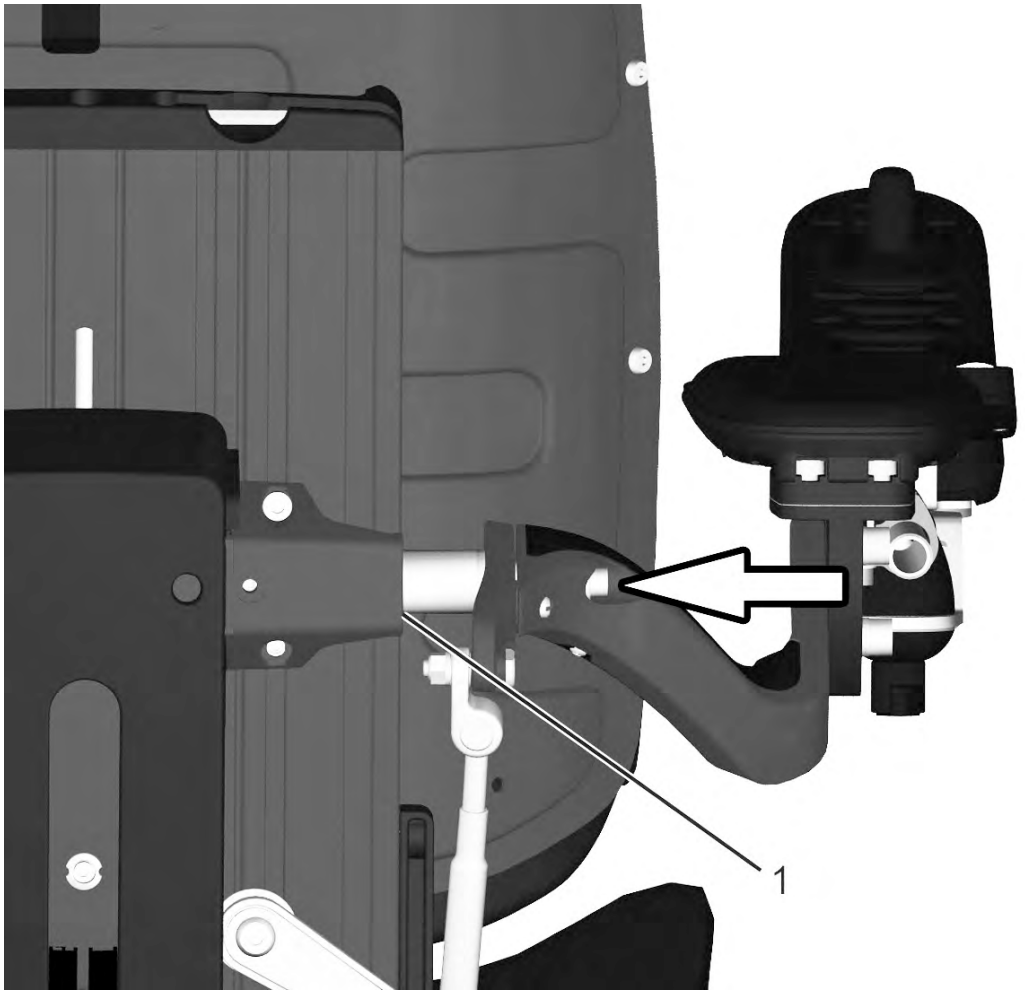


Figure 259. The armrest width is fixed using one screw.

Turn the adjustment bar bracket

For this task the following tools are necessary:

- 1 Block spanner 10 mm.

With the armrests set both wide and low, the adjustment bar for the left armrest angle can touch the rear actuator bracket for the backrest angle. If this is the case, turn the adjustment bar bracket.

1. Remove the lower bracket of the adjustment bar, which is secured with a screw, washer and nut. See fig. 260(1).
2. Turn the bracket 180° so the adjustment bar is closer to the center of the seat. See fig. 260(2).
3. Refit the lower bracket of the adjustment bar in its new position using the screw, washer and nut. See fig. 260(3).

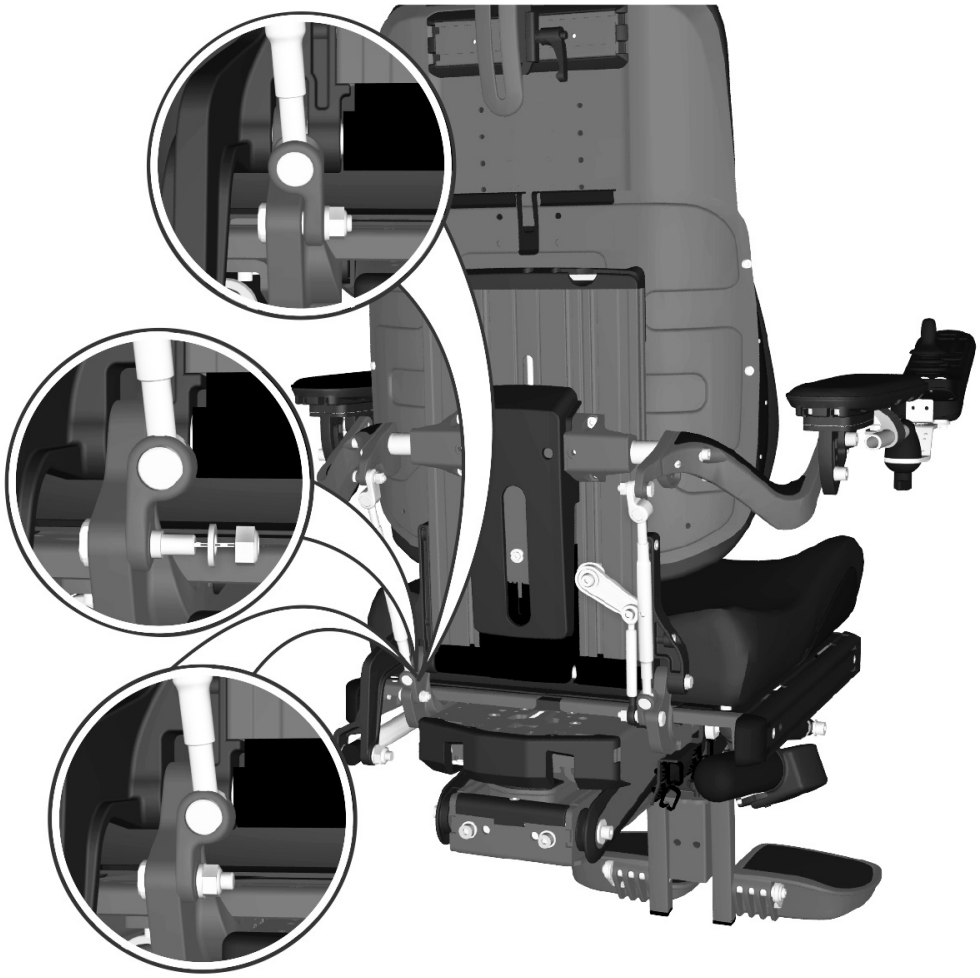


Figure 260. Turn the bracket 180° so the adjustment bar is closer to the centre of the seat.

Thigh support

The position of the thigh support can be adjusted forwards or backwards to give the user optimal comfort. Slide the thigh support forwards or backwards to the desired position.

Figure 261. The position of the thigh support can be adjusted

Trunk support height

For this task the following tools are necessary:

- 1 Allen key 5 mm.

The height of the trunk support can be adjusted to give the user optimal comfort.

1. Loosen the screw for trunk support height adjustment approximately 2 turns. See fig. 262.
2. Slide the trunk support up/down to the desired position.
3. Secure it at the required setting by retighten the screw.

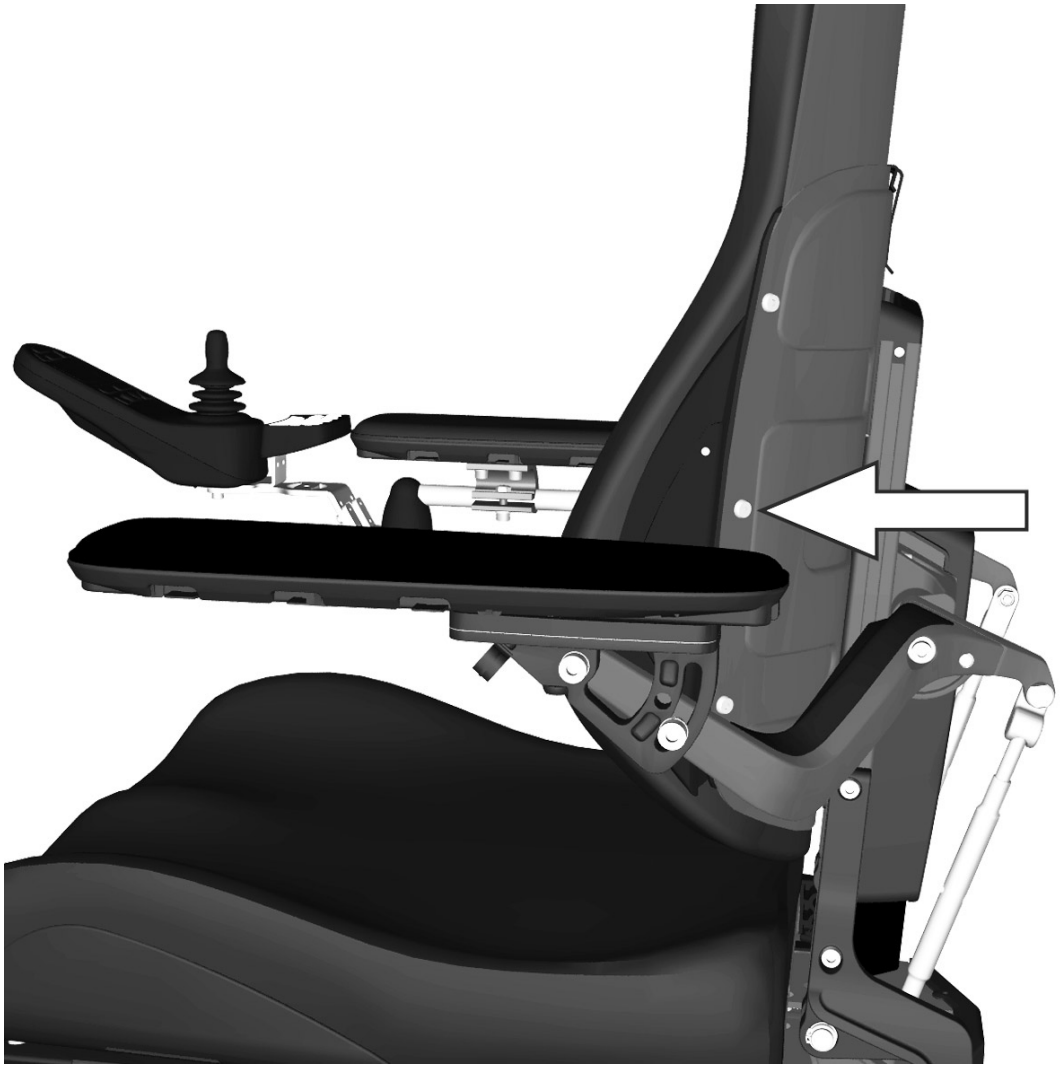


Figure 262. The trunk support height is fixed using one screw.

CONTROL SYSTEM

The wheelchair's control system can be programmed in order to optimize the performance of the wheelchair while also maintaining a high level of safety regardless of the wheelchair's other settings and equipment. The control system can also be programmed in order to make adjustments needed for a specific user. Standard parameter files can be downloaded from Permobil's website, *www.permobil.se*.

For more information on programming/adjustment of the **Rnet** control system and obtaining parameter files, see the technical user manual for programming R-net.

TROUBLESHOOTING R-NET

Troubleshooting guide

The following troubleshooting guide describes a number of faults and events which may occur when you use your wheelchair, together with suggested remedies. Note that this guide cannot describe all the problems and events which may occur and you should always contact your service contact or Permobil in case of doubt.

EVENT	POSSIBLE CAUSE	REMEDY
The wheelchair cannot be started.	Batteries discharged.	Charge the batteries.
	The cable connection to the control panel has come loose.	Insert the cable in the control panel.
	Main fuse switched to OFF position after, for example, battery replacement.	Reset the main fuse. See page 93
	Main fuse triggered.	See page 93
The wheelchair cannot be driven.	Battery charger connected.	Stop charging and disconnect the charging cable from the wheelchair's charging socket.
	Brake release activated.	Reset the brake release.
	Wheelchair locked with the security key.	Unlock the wheelchair. See the Owner's manual for more information.
The wheelchair "switches itself off" after a certain period of inactivity (20-30 min.).	The electronics' energy saving mode has been activated.	Switch the wheelchair on again using the start key on the control panel.
The wheelchair stops while being driven.	The cable connection to the control panel has come loose.	Insert the cable in the control panel.
	Main fuse triggered.	See page 93
The wheelchair can only be driven at reduced speed. (Applies with an electric seat lift and seat angle.)	Seat lift or seat angle raised too high. See the Owner´s manual for more information.	Lower the seat lift or seat angle.
The wheelchair cannot be charged.	Main fuse switched to OFF position after, for example, battery replacement.	See page 93
	The charging fuse is triggered	Wait for 5 minutes. The fuse will be automatically reset.

Diagnostics R-net LCD

When an error or a fault occurs in the wheelchair's electronics, information on it is displayed in the control panel's display. This information can then be used to diagnose where the error/fault occurred and its cause.

Troubleshooting and repairs must always be performed by competent personnel with good knowledge of the wheelchair's electronics. More information on troubleshooting and remedies can be found in the Service Manual for this wheelchair model.

Diagnostic screens

Current diagnostic screen

When the control system's integrated protection circuits have been triggered so that the control system can no longer operate the wheelchair, a diagnostic screen is displayed in the control panel's display.

This indicates a system fault, i.e. R-net has detected a problem somewhere in the wheelchair's electrical system.

NOTE!
If the fault is in a module that is not currently being used, it may still be possible to drive the wheelchair, but the diagnostic screen is displayed occasionally.

Switch off the wheelchair and leave it off for a few minutes. Then restart the wheelchair. If the fault persists, you must switch off the wheelchair and contact your service contact. Write down the information displayed in plain text in the control panel's display and pass it on to your service contact.

Do not use the wheelchair until the problem has been remedied or you have received other instructions from your service contact.

⚠ WARNING!

Diagnostics should only be performed by persons with sound knowledge of the wheelchair's electronic control system. Incorrect or poorly performed repair works may make it dangerous to use the wheelchair. Permobil accepts no liability for any personal injury or damage to the wheelchair and its surroundings that occurs on account of incorrect or poorly performed repair work.

⚠ CAUTION!

If any part is replaced without Permobil's approval, the wheelchair's warranty lapses. Permobil accepts no liability for any loss that occurs as a a result of a component of the R-net control system being opened, adjusted or modified without permission.

Example of a screen showing a system fault

Identified module

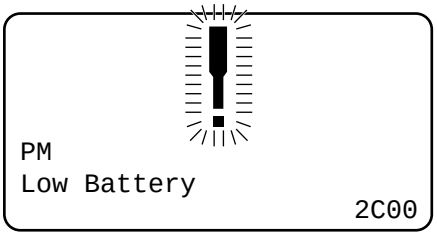


Figure 263. System fault.

This indicates the control system module that detected the problem.

PM= Power module

JSM= Joystick module

Error message

The error message provides a brief description of the error type.

Error code

The four-digit code indicates which protection circuit has been triggered.

Repair of defective units

Apart from specific OEM-approved spare parts (contact Permobil for further information on these), there are no replaceable parts in the R-net control system. Consequently, defective units must be sent to Permobil or a Permobil-approved repairer for repair.

Example

The screen example shown below displays the following information:

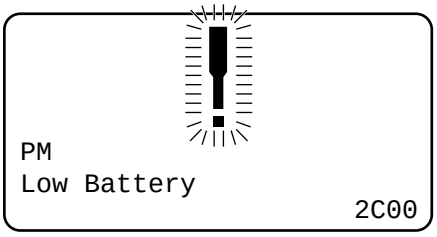
Identified module: Power module error

Error message: Low Battery

Error code: 2C00

This means that the battery needs charging or that the battery has not been connected properly.

- Check the battery connections. Attempt to charge the battery if it is properly connected.



System log

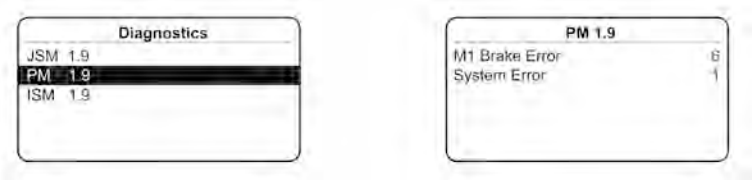
All errors are saved in the system log regardless of whether they have been remedied or are still active. The system log saves the error messages and the number of times they arise. The errors are saved in their respective modules within the system.

The system log is accessed by means of programming directly in the system (On Board Programming, OBP).

Contact Permobil or your repair engineer for more information on OBP.

Go to OBP mode

- Select System from the menu.
- Select Diagnostics from the menu.
- The diagnostics screen will now appear, showing the connected modules and version history. See the illustration below.
- If a module has experienced no errors, the message No Entries will be displayed, otherwise something similar to the screenshot below will be displayed.



Definitions of diagnostics messages

When an error message has been displayed and the defective module has been identified, you can use the following definitions to determine the possible cause of the error and what remedial action is required to correct it.

Error message	Description
Joystick Error	Go to section 3.1.
Low Battery	Go to section 3.2.
High Battery	Go to section 3.3.
M1 Brake Error	Go to section 3.4.
M2 Brake Error	Go to section 3.4.
M1 Motor Error	Go to section 3.5.
M2 Motor Error	Go to section 3.5.
Inhibit Active	Go to section 3.6.
Jstick Cal Error	Go to section 3.7.
Latched Timeout	Go to section 3.8.
Brake Lamp Short	Go to section 3.9.
Left Lamp Short	Go to section 3.10.
Right Lamp Short	Go to section 3.10.
L Ind Lamp Short	Go to section 3.11.
R Ind Lamp Short	Go to section 3.11.
L Ind Lamp Failed	Go to section 3.12.
R Ind Lamp Failed	Go to section 3.12.
DIME Error	Go to section 3.16.
Memory Error	Go to section 3.17.
PM Memory Error	Go to section 3.18.
Bad Cable	Go to section 3.19.
Bad Settings	Go to section 3.20.
Module Error	Go to section 3.21.
System Error	Go to section 3.22.
Gone to Sleep	Go to section 3.23.
Charging	Go to section 3.24.

Joystick Error

The commonest cause for this error is that the joystick was moved away from its central position before and during the time at which the control system was switched on. The screen for a shifted joystick is displayed for 5 seconds. If the joystick is not released during this time, a joystick error is registered. Even if an error screen is not displayed, the error and the number times it arises is registered in the system log.

- Ensure that the joystick is in the central position and start up the control system.

If the error persists, the joystick or joystick module may be defective. Read more in *Repairing defective units*, Page 168.

Low Battery

This occurs when the control system detects that the battery voltage is lower than 16 V.

- Check the batteries and their connection to the control system.

If the error persists after the batteries and connections have been checked, the power module may be defective. Read more in *Repairing defective units*, Page 168.

High Battery

This occurs when the control system detects that the battery voltage is higher than 35 V. The commonest causes for this error are that the battery has been overcharged or a poor connection between the control system and the batteries.

- Check the batteries and their connection to the control system.

If the error persists after the batteries and connections have been checked, the power module may be defective. Read more in *Repairing defective units*, Page 168.

Brake Error

This occurs when the control system detects a problem in the solenoid brakes or the connections to them.

1505 - M1 Brake Error

1506 - M2 Brake Error

- Check the solenoid brakes, their cables and the connections to the control system.

If the error persists after the checks listed above, the power module may be defective. Read more in *Repairing defective units*.

Motor Error

This occurs when the control system detects that a motor has been disconnected.

3B00 - M1 Motor Error

3C00 - M2 Motor Error

- Check the motors, their cables and the connections to the control system.

If the error persists after the checks listed above, the power module may be defective. Read more in *Repairing defective units*, Page 168.

Inhibit Active

This occurs when one of the inhibit signals is active and is in blocked mode.

The last two digits of the error code indicate the active inhibit signal. The code is hexadecimal.

1E01 - For inhibit signal 1.

1E09 - For inhibit signal 9.

1E0A - For inhibit signal 10.

- Cycle the voltage. This will deactivate the block mode, which may remedy the error.
- Check all connections and switches for the indicated inhibit signals.

Joystick Calibration Error

This occurs when joystick calibration has been unsuccessful.

- Go to OBP mode and recalibrate.

If the error persists, the joystick module may be defective. Read more in *Repairing defective units*, Page 168.

Latched Timeout

This occurs when the control system detects that the programmed block time has been exceeded. This can, for example, be due to the signal units (joystick, main steering device, suction and blowing device, etc.) not having been used frequently enough.

The error reference provides information on why the control system has left block mode.

- Cycle the voltage.
- Activate block mode.

If the error persists after the checks listed above, the signal unit may be defective. Read more in *Repairing defective units*, Page 168.

Brake Lamp Short

This occurs when the control system detects a short circuit in the brake lamp electrical circuit. Read more about connectors in section 2.3.

- Check the brake lamps, their cables and the connections to the control system.

Lamp Short

This occurs when the control system detects a short circuit in the electrical circuit of one of the lamps.

7205 - Short circuit left-hand lamp.

7209 - Short circuit right-hand lamp

- Check the lamps, their cables and the connections to the control system.

Indicator Lamp Short

This occurs when the control system detects a short circuit in the electrical circuit of one of the indicators.

7206 - Short circuit left indicator.

720A - Short circuit right indicator.

- Check the indicators, their cables and the connections to the control system.

Indicator Lamp Failed

This occurs when the control system detects an error in the electrical circuit of one of the indicators. This usually means the indicator needs replacing.

7207 - Error in left indicator.

7208 - Error in right indicator.

- Check the indicators, their cables and the connections to the control system.

DIME Error

This occurs when the control system detects an ID conflict between two modules in the system.

If a new module has been added:

- Disconnect the new module and cycle the voltage.
- If no error occurs, connect the new module to the system and cycle the voltage.
- If the error recurs, the new module must be the cause of the problem.

If no new modules have been added:

- Disconnect one module at a time and cycle the voltage.

If the error persists after the checks listed above have been performed, consult your service contact or Permobil.

Memory Error

This is a non-specific memory error that may be caused by any of the system modules.

- Check all cables and connections.
- Cycle the voltage.

If the error persists and the system includes third-party modules:

- Disconnect all modules that do not come from PGDT and cycle the voltage.

If this has dealt with the error:

- Connect one third-party module at a time and cycle the voltage each time.
- If the error recurs after one of the voltage cycles, the last module to be connected must be defective.

•

If the error persists after the checks listed above, the power module may be defective. Read more in *Repairing defective units*, Page 168.

PM Memory Error

⚠ CAUTION!

Programming should only be performed by persons with sound knowledge of control systems from PGDT. Incorrect programming can mean that the wheelchair is not safe to use. Permobil cannot be held responsible for losses of any kind if the control system factory settings are altered by programming.

This is a specific error in the power module.

- Check all cables and connections.
- Reprogram the control system with the help of R-net's PC programmers.

This should be done with either the latest specific program file for the wheelchair or Permobil's original program file.

If the error persists after the checks listed above, the power unit may be defective. Read more in *Repairing defective units*, Page 168.

Bad Cable

This occurs when the control system detects a connection error in the communication cables between the modules.

- Check all cables and connections to ensure there is no stoppage.
- Replace any cables with visible damage. Then cycle the voltage.
- Disconnect one cable at a time from the system and cycle the voltage after each disconnection.

If the error persists after the checks listed above, the power unit may be defective. Read more in *Repairing defective units*, Page 168.

Bad Settings

This occurs when the control system detects incorrect or invalid program settings.

- Check all parameter settings and then reprogram the control system with the help of R-net's PC programmers.
- Make a note of the current parameter settings and then reset the control system to the standard settings.
- Reprogram the required settings in small groups and cycle the voltage after each group to see if the error recurs.

If the error persists after the checks listed above, the power unit may be defective. Read more in *Repairing defective units*, Page 168.

Module Error

This occurs when the control system detects an error in a specific module. The module is displayed on the diagnostics screen according to the description in section 2.

- Check all cables and connections.
- If the error persists after the checks listed above, the module specified may be defective. Read more in *Repairing defective units*, Page 168.

System Error

This occurs when the control system detects an error that cannot be ascribed to a specific module.

- Check all cables and connections.
- Cycle the voltage.

If the error persists and the system includes third-party modules:

- Disconnect all modules that do not come from PGDT and cycle the voltage.

If this has dealt with the error:

- Connect one third-party module at a time and cycle the voltage each time.
- If the error recurs after one of the voltage cycles, the last module to be connected must be defective.

If the error persists after the checks listed above, the system from PGDT may be defective. Read more in *Repairing defective units*, Page 168.

Gone to Sleep (energy saving mode)

This occurs when the system has not been used for a period that exceeds the Sleep Timer parameter used for setting the energy saving mode. Each time this occurs it is registered in the system log.

Charging

This occurs when the control system detects that a charger has been connected to either inhibit contact 1 or inhibit contact 3. Read more about connectors in section 2.3.

The screen for battery charging is displayed when a charger is connected.

Each time this occurs it is registered in the system log.

When using an integral charger:

- Disconnect the charger from the mains.

When using an external charger:

- Disconnect the charger from the power wheelchair.

If the error persists after the charger has been disconnected, the joystick module may be defective. Read more in *Repairing defective units*, Page 168.

Basic test

⚠ CAUTION!

The tests described are minimum recommendations. It is the responsibility of the repair engineer(s) to perform other tests on the basis of the original error source and the wheelchair model. The necessary information on other tests is available in the wheelchair service manual. Permobil cannot be held responsible for losses of any kind that may arise when these tests are conducted, or that arise as a consequence of further relevant tests not being conducted. These tests should be conducted in an open space, and some kind of clamping device, such as a safety belt, should always be used. Permobil cannot be held responsible for losses for any kind arising due to these recommendations not being observed.

After a repair has been completed, the following test should be performed. These are minimum recommendations. Depending on what the original error source was, further tests may be necessary.

Basic inspection

Check that all contacts are properly connected.

- Check all cables and contacts to ensure there is no visible damage.
- Check that the rubber gaiter around the base of the joystick is not damaged. Inspect the gaiter visually. It should not be subjected to manual handling.
- Ensure that all components of the control system are securely installed.
- Do not over-tighten the assembling screws.

Brake test

These tests should be carried out on an even surface with at least one meter of free space around the wheelchair.

- Switch on the control system.
- Check that the screen remains on after start-up.
- Bring the joystick slowly forwards until you hear the parking brakes functioning. In some cases the wheelchair may begin to move.
- Release the joystick immediately. You must hear both parking brakes functioning within 2 seconds.
- Repeat the test three times, bringing the joystick slowly backwards, to the left and to the right.

Test run

Set the highest permitted speed to the lowest value and run the wheelchair in all directions while checking that it runs smoothly and is easy to maneuver.

Repeat the test with the speed control set to the highest possible value.

Gradient test

⚠ WARNING!

When this test is conducted, an additional person must be present in order to prevent the wheelchair tipping over backwards.

Run the wheelchair forwards up its steepest permitted gradient. Release the joystick when the wheelchair is on the upward slope and check that the wheelchair stops and that the brakes function as they should without the front wheels lifting from the ground.

Bring the joystick forwards and continue to run up the slope. Check that the wheelchair moves gently forwards.

Stop the wheelchair and reverse down the slope. Release the joystick when the wheelchair is on the upward slope and check that the wheelchair stops and that the brakes function as they should without the front wheels lifting from the ground.

Test of lights, indicators and warning lights

If the wheelchair is equipped with lights:

- Check that all bulbs light up as they should.
- Check that all bulbs light up as they should and that the flashing frequency is 1.5 Hz ± 0.5 Hz.
- Remove the bulbs in turn and check that the remaining bulb on the same side flashes at a requency of 3 Hz ± 0.5 Hz.

If the wheelchair is equipped with warning lights:

- Check that all bulbs light up as they should and that the flashing frequency is 1.5 Hz ± 0.5 Hz.

Test of adjustment device

If the wheelchair is equipped with an adjustment device:

- Check that all motors move in the right direction.
- Make sure that the mechanical end stops are secured and that they stop the adjustment device motors, and thus use the automatic end stop tracking that is in the seat and light module (ISM).

Test of inhibit signal

Connect a suitable battery charger or equivalent inhibit connecting device in the charging contact on the joystick module and check that the wheelchair is prevented from running.

If inhibit contacts 2, 3, 4 and 5 are used for inhibiting or speed restriction, an appropriate test should be performed in order to check that they are functioning as they should.

Repairing defective units

Apart from specific OEM-approved spare parts (contact Permobil for further information on these), there are no replaceable parts in the R-net control system. Consequently, defective units must be sent to Permobil or a Permobil-approved repairer for repair.

⚠ CAUTION!

If any part is replaced without Permobil's approval, the control system's warranty lapses.
Permobil cannot be held responsible for losses of any kind arising as a result of a component of the R-net control system being opened, adjusted or modified without permission.

Diagnostics R-net LED

Battery voltage indicator

Each time the wheelchair is started, parts of the wheelchair´s electronics are checked. If any fault has occurred in these parts, this is displayed on the control panel´s battery voltage indicator and the indicator for speed/driving profile in the form of one or more flashing lamps.

Troubleshooting and repairs must always be performed by competent personel with good knowledge of the wheelchair´s electronics. More information on troubleshooting and remedies can be found in the Service Manual for this wheelchair model.

⚠ CAUTION!

Any error signals on the indicators are not displayed while the wheelchair is being driven. They appear when it is next started.
If any part is replaced without Permobil's approval, the wheelchair's warranty lapses. Permobil accepts no liability for any loss that occurs as a a result of a component of the R-net control system being opened, adjusted or modified without permission.

Permanently on

Everything is in order. The number of lamps that light up depends on the voltage remaining in the batteries. If the batteries are fully charged, all the lamps light up.

Slowly flashing red lamps, 1–2 lamps

The batteries need to be charged immediately.

Rapid flashing, 1–10 lamps

A fault has been detected in the wheelchair´s electronics and the wheelchair can not be driven.

- Switch of the wheelchair.
- Check that all visible cables and the cable to the control panel are connected correctly.
- Switch the wheelchair on again. If the fault persists, count the number of flashing lamps and check for a possible cause and remedy in the table on the adjoining page.
- Do not use the wheelchair until the problem has been remedied or you have received other information from your service contact.

⚠ WARNING!

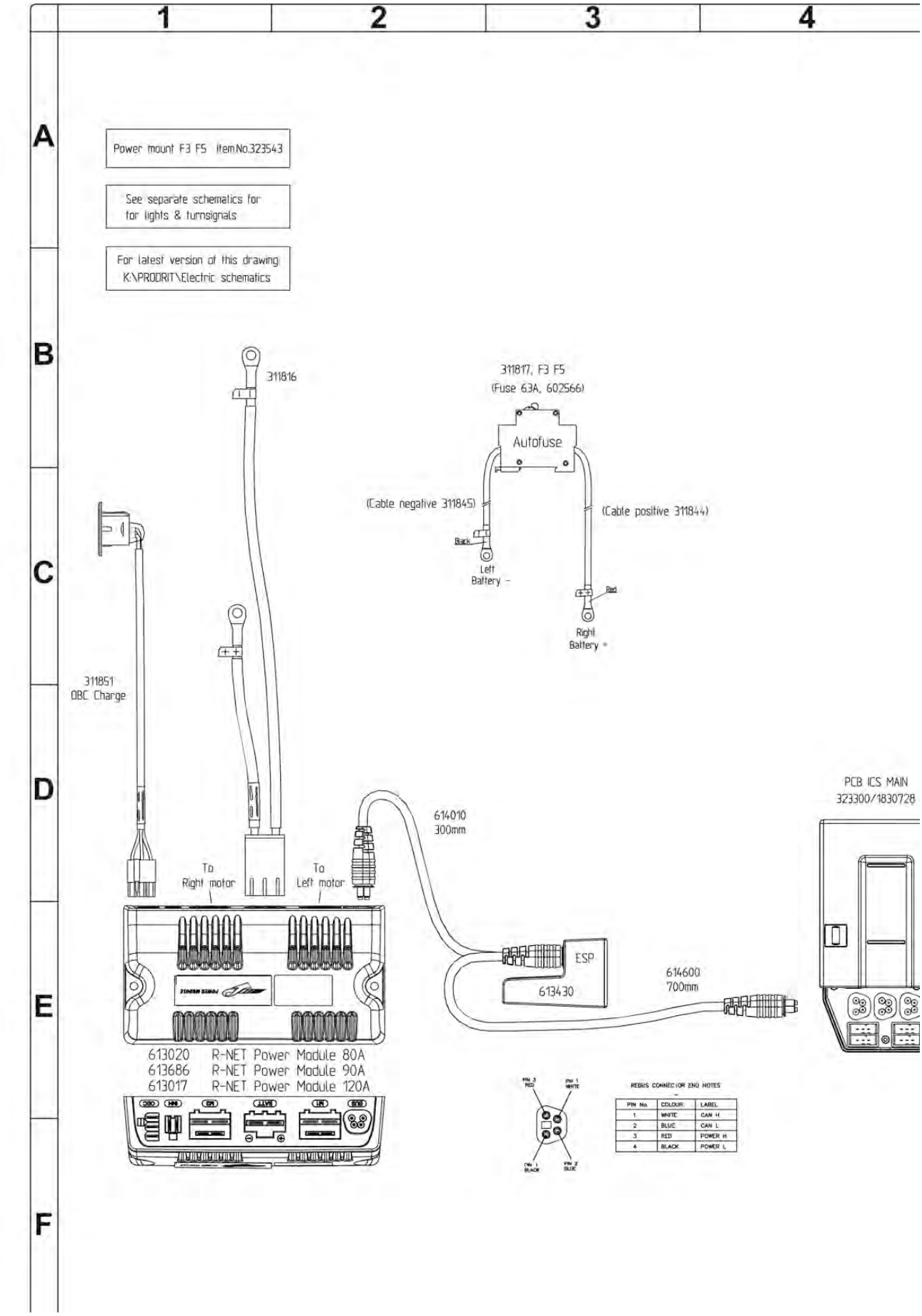
Diagnostics should only be performed by persons with sound knowledge of the wheelchair's electronic control system. Incorrect or poorly performed repair works may make it dangerous to use the wheelchair. Permobil accepts no liability for any personal injury or damage to the wheelchair and its surroundings that occurs on account of incorrect or poorly performed repair work.

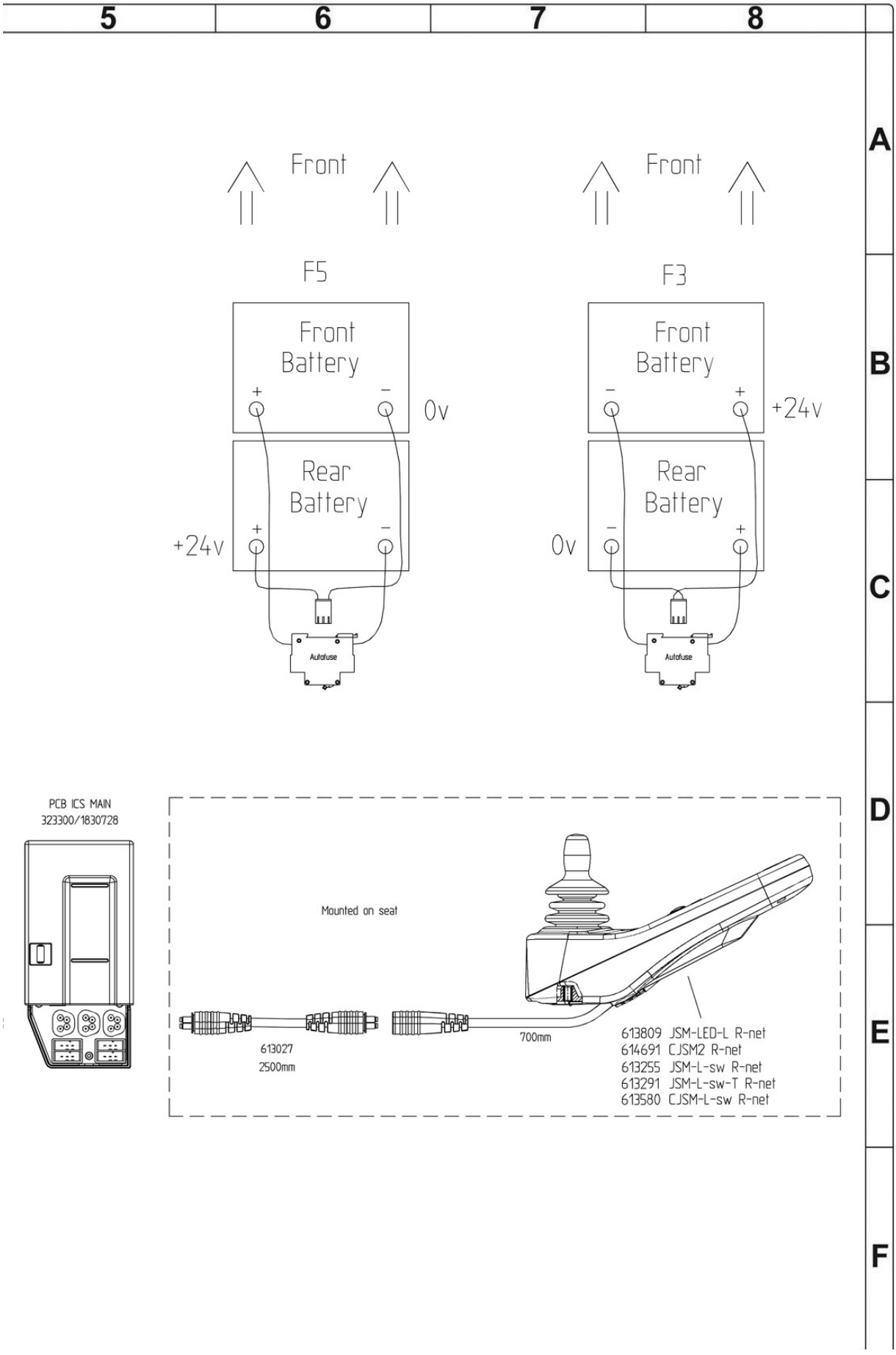
Example of error messages and remedies

EXAMPLE OF ERROR MESSAGES AND REMEDIES	
	**1 Lamp — Low battery voltage** Check the condition of the batteris. Check the contact between the battery and the control unit.
	**2 Lamps — Failure in left drive motor** Check the connection of the left drive motor.
	**3 Lamps — Short-circuit in left drive motor** Check the left drive motor's contacts and cables.
	**4 Lamps — Failure in right drive motor** Check the connection of the right drive motor.
	**5 Lamps — Short-circuit inright drive motor** Check the right drive motor´s contacts and cables.
	**6 Lamps — Battery charger connected** Disconnect the battery charger.
	**7 Lamps — Joystick error** Check that the joystick has not been moved when the wheelchair is started.
	**8 Lamps — Control system error** Check the contacts to the output stage.
	**9 Lamps — Failure in brake circuit** Check the contacts to the magnetic brakes.
	**10 Lamps — High battery voltage** Check the battery and the contacts between the battery and the output stage.
	**7+5 Lamps — Communication error** A communication error has been indicated. Check that the cable to the control panel is not damaged and is correctly inserted.
	**Actuator indicator — Actuator error** An actuator error has been indicated. If the wheelchair is fitted with more then one actuator, check which one is not working. Check the actuator´s cable connections.

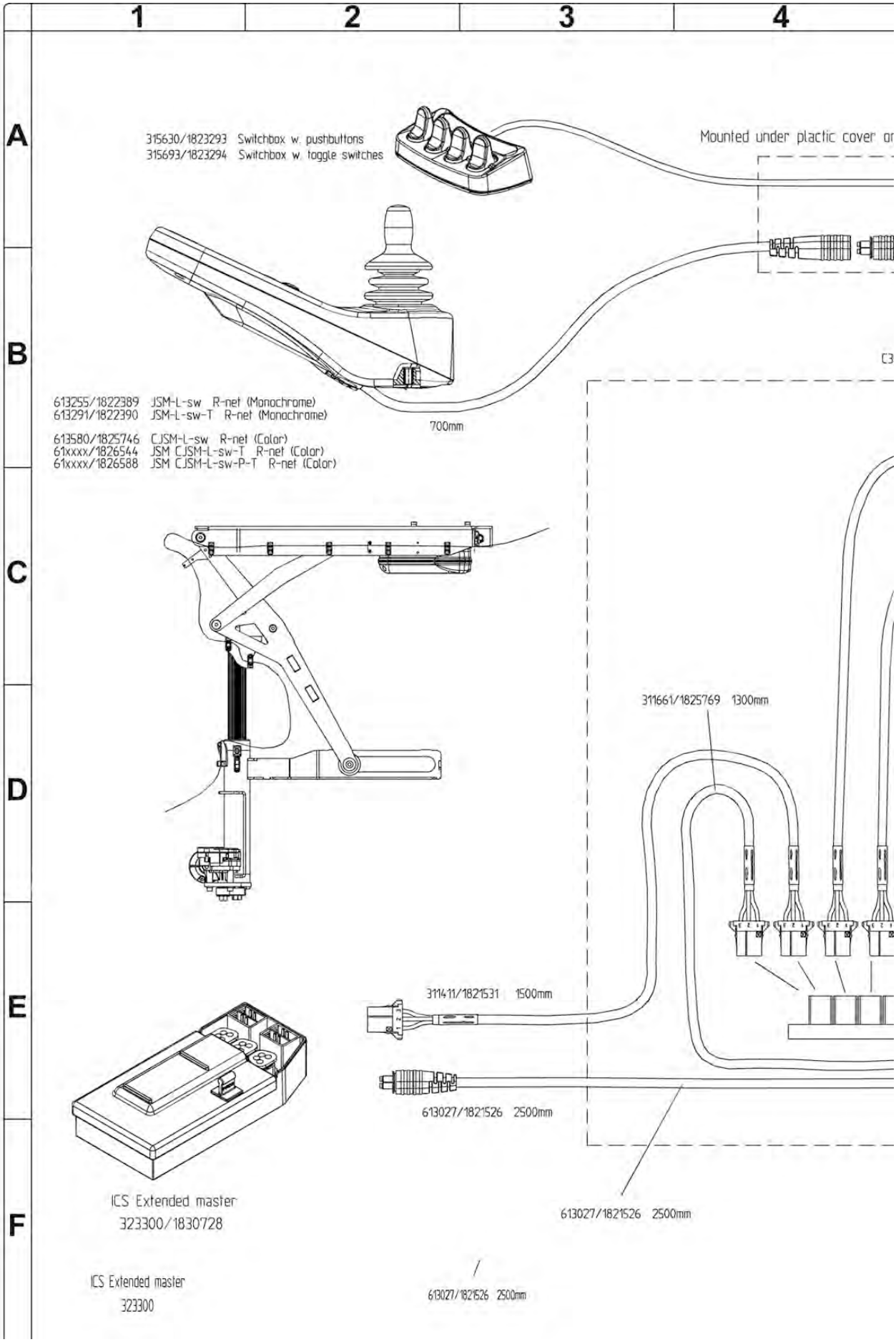
CABLING OVERVIEW

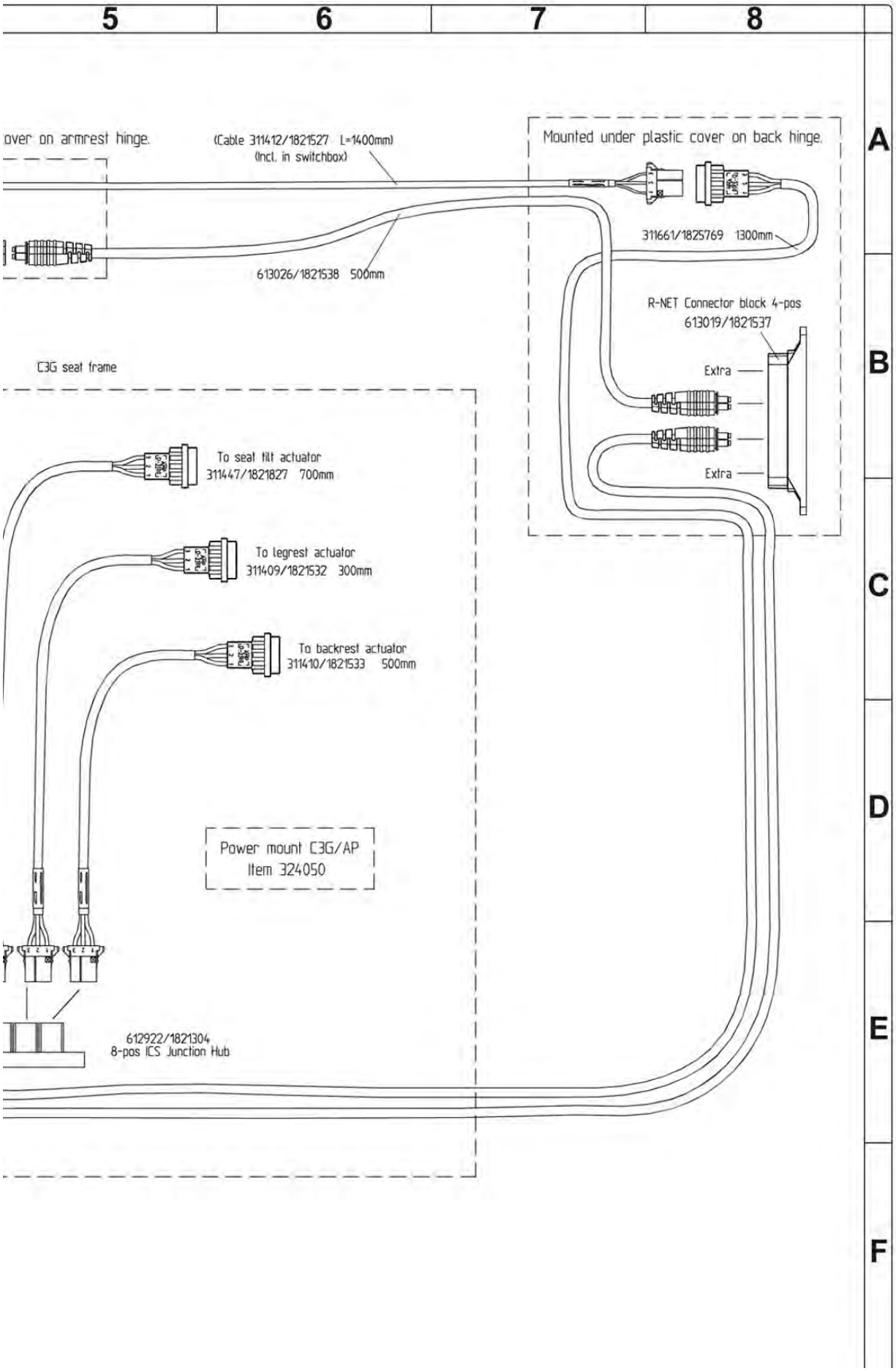
Chassis


1
2
3
4
A
B
C
D
E
F
Power mount F3 F5 Item No.323543
See separate schematics for for lights & turnsignals
For latest version of this drawing: K:\PRODRIT\Electric schematics
311816
311817, F3 F5
(Fuse 63A, 602566)
Autofuse
(Cable negative 311845)
(Cable positive 311844)
Black
Left Battery -
Red
Right Battery +
311851
OBC Charge
To Right motor
To Left motor
614010
300mm
ESP
613430
614600
700mm
PCB ICS MAIN
323300/1830728
613020 R-NET Power Module 80A
613686 R-NET Power Module 90A
613017 R-NET Power Module 120A
REBUS CONNECTOR END NOTES
PIN No.
COLOUR
LABEL
1 WHITE CAN H
2 BLUE CAN L
3 RED POWER H
4 BLACK POWER L


5
6
7
8
A
B
C
D
E
F
Front
Front
F5
F3
Front Battery
Rear Battery
0v
+24v
+24v
0v
Autofuse
Autofuse
PCB ICS MAIN
323300/1830728
Mounted on seat
613027
2500mm
700mm
613809 JSM-LED-L R-net
614691 CJSM2 R-net
613255 JSM-L-sw R-net
613291 JSM-L-sw-T R-net
613580 CJSM-L-sw R-net

Seat


1
2
3
4
A
B
C
D
E
F
315630/1823293 Switchbox w. pushbuttons
315693/1823294 Switchbox w. toggle switches
Mounted under plactic cover or
613255/1822389 JSM-L-sw R-net (Monochrome)
613291/1822390 JSM-L-sw-T R-net (Monochrome)
613580/1825746 CJSM-L-sw R-net (Color)
61xxxx/1826544 JSM CJSM-L-sw-T R-net (Color)
61xxxx/1826588 JSM CJSM-L-sw-P-T R-net (Color)
700mm
311661/1825769 1300mm
311411/1821531 1500mm
613027/1821526 2500mm
613027/1821526 2500mm
ICS Extended master
323300/1830728
ICS Extended master
323300
613027/1821526 2500mm


5
6
7
8
A
B
C
D
E
F
over on armrest hinge.
(Cable 311412/1821527 L=1400mm)
(Incl. in switchbox)
Mounted under plastic cover on back hinge.
311661/1825769 1300mm
613026/1821538 500mm
R-NET Connector block 4-pos
613019/1821537
Extra
Extra
C3G seat frame
To seat tilt actuator
311447/1821827 700mm
To legrest actuator
311409/1821532 300mm
To backrest actuator
311410/1821533 500mm
Power mount C3G/AP
Item 324050
612922/1821304
8-pos ICS Junction Hub

RECOMMENDED CUSHIONS, SEAT PLATES AND UNITRACK RAILS

Seat cushions, seat plates and UniTrack rails

Seat depth	**Seat width**	**Cushion** (Length)	**Cushion** (Width)	**Seat plate** (Length)	**UniTrack rail** (Length)
370 mm / 15”	420/470/520 mm / 17”/19”/21”	420 mm / 17”	= Sitsbredd	370 mm / 15”	370 mm - 420 mm 15” - 17”
395 mm / 16”			= Sitsbredd	370 mm / 15”	370 mm - 420 mm 15” - 17”
420 mm / 17”			= Sitsbredd	420 mm / 17”	370 mm - 420 mm 15” - 17”
445 mm / 18”			= Sitsbredd	420 mm / 17”	445 mm - 495 mm 18” - 20”
470 mm / 19”		470 mm / 19”	= Sitsbredd	470 mm / 19”	445 mm - 495 mm 18” - 20”
495 mm / 20”			= Sitsbredd	470 mm / 19”	445 mm - 495 mm 18” - 20”
520 mm / 21”		520 mm / 21”	= Sitsbredd	520 mm / 21”	520 mm - 570 mm 21” - 23”
545 mm / 22”			= Sitsbredd	520 mm / 21”	520 mm - 570 mm 21” - 23”
570 mm / 23”			= Sitsbredd	570 mm / 23”	520 mm - 570 mm 21” - 23”

Backrest cushions

Backrest width	**Backrest height**	**Cushion** (Width)	**Cushion** (Height)
360 mm / 14.5”	Low, height not adjustable	360 mm / 14.5”	480 mm / 19.5”
	545 mm / 22”		545-595 mm / 22”-24”
	570 mm / 23”		
	595 mm / 24”		
	620 mm / 25”		620-670 mm / 25”-27”
	645 mm / 26”		
	670 mm / 27”		
410 mm / 16.5	Low, height not adjustable	410 mm / 16.5”	480 mm / 19.5”
	545 mm / 22”		545-595 mm / 22”-24”
	570 mm / 23”		
	595 mm / 24”		
	620 mm / 25”		620-670 mm / 25”-27”
	645 mm / 26”		
	670 mm / 27”		
460 mm / 18.5”	Low, height not adjustable	460 mm / 18.5”	480 mm / 19.5”
	545 mm / 22”		545-595 mm / 22”-24”
	570 mm / 23”		
	595 mm / 24”		
	620 mm / 25”		620-670 mm / 25”-27”
	645 mm / 26”		
	670 mm / 27”		

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